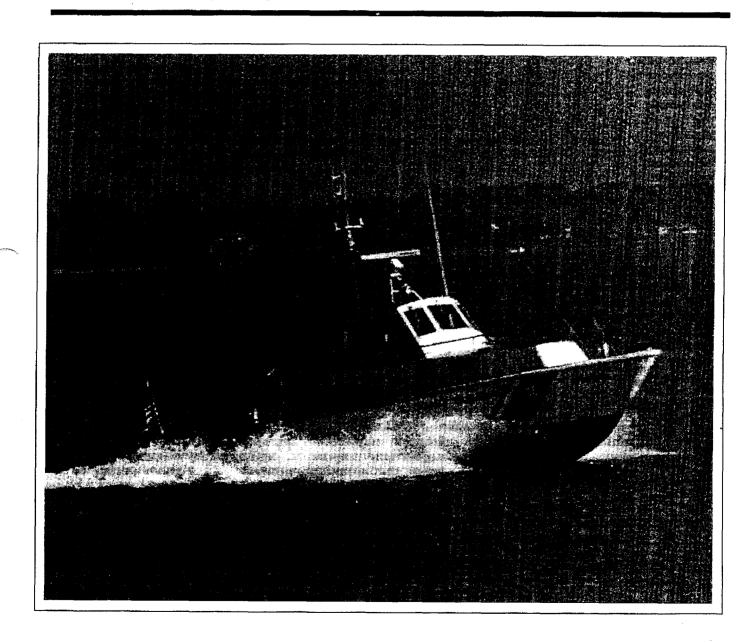
# 41' UTILITY BOAT OPERATOR'S HANDBOOK

U.S. Department of Transportation

United States
Coast Guard

### **COMDTINST M16114.2C**



#		

#### Commandant United States Coast Guard

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COMDTINST M16114.2C JUL 2 1999

#### **COMMANDANT INSTRUCTION M16114.2C**

Subj: 41' UTB OPERATOR'S HANDBOOK

- 1. <u>PURPOSE</u>. This instruction provides technical orientation, performance characteristics, and basic operating procedures for the 41' Utility Boat, Big (UTB). It also standardizes boat outfit equipment and layout.
- 2. <u>ACTION</u>. Area and district commanders, commanders of maintenance and logistics commands, commanding officers of headquarters units, assistant commandants for directorates, Chief Counsel, and special staff offices at Headquarters shall ensure adherence to the contents of this instruction at all units which operate and/or maintain 41' UTBs. To ensure standardization, there is no command prerogative with regard to the type or location of equipment carried except as noted. All design or structural alterations are prohibited unless specifically authorized by Commandant (G-SEN).
- 3. <u>DIRECTIVES AFFECTED</u>. This manual cancels the 41' UTB Operator's Handbook, COMDTINST M16114.2B on 01 Oct 1999.
- 4. <u>DISCUSSION</u>. This handbook contains the information necessary to safely and efficiently operate the 41' UTB. The operational capabilities, limitations, and emergency procedures are clearly stipulated. The fittings, outfit list, and physical characteristics of the boat are pictured and described in detail. This publication is directive in nature and applies to all 41' UTB crews, operational, and supervisory commands. This handbook revision serves the following purpose:
  - a. It incorporates the numerous changes to the 41' UTB and its authorized outfit which have occurred over the past six years.
  - b. It reformats the manual into an information mapping style for easy reading and reference.

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- c. It incorporates into Chapter 5 the revised 41' UTB operating parameters, indicating the requirements, responsibilities and actions to be taken upon the occurrence of disabling casualties, restrictive, major and minor discrepancies. This change is consistent with the new Coast Guard Boat Readiness and Standardization Program that becomes effective 01 Oct 1999.
- d. It provides an inclusive list and definition of each disabling casualty, restrictive and major discrepancy in Appendices E and F.
- e. It provides the standardized requirements of a full power trial for the 41' UTB in Appendix G.
- 5. <u>PROCEDURE</u>. District, operational and unit commanders for all 41' UTB units shall ensure the procedures and limitations detailed within this instruction are followed. Forward any comments, corrections, recommendations and questions regarding this handbook to the UTB Systems Center in accordance with Section 1.C. of this manual. Design and structural change requests shall be submitted as outlined in the Naval Engineering Manual, COMDTINST M9000.6 (series).

6. <u>POLLUTION PREVENTION (P2) CONSIDERATIONS</u>. Pollution Prevention considerations were examined in the development of this directive and have been determined to be not applicable.

ERNEST R. RIUTTA

Assistant Commandant for Operations



### **RECORD OF CHANGES**

CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	ENTERED BY





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**APPENDIX E: DISABLING CASUALTIES** 

APPENDIX F: RESTRICTIVE DISCREPANCIES

APPENDIX G: FULL POWER TRIAL



### Chapter 1 Introduction

### **Overview**

#### Introduction

This handbook outlines safety and operational procedures for the Coast Guard's 41' Utility Boat (UTB). It clearly defines operational capabilities, limitations, and emergency procedures. In addition, it shows or describes the fittings, outfit list, and physical characteristics of the boat.

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### Operators Manual - 41' UTB





### Section A. Warnings, Cautions, And Notes

### A.1. General

The following definitions apply to Warnings, Cautions, and Notes found throughout the handbook.

### A.2. WARNING 🖑

Operating procedures or techniques which must be carefully followed to avoid personal injury or loss of life.

### A.3. CAUTION!

Operating procedures or techniques which must be carefully followed to avoid equipment damage.

### A.4. NOTE &

An operating procedure or technique essential to emphasize.

### Chapter 1 - Introduction





### Section B. Facility Management

# B.1. Commandant (G-OCS)

Commandant (G-OCS) is the facility manager for the 41' UTB. The 41' UTB is a standard boat as defined in the Boat Management Manual, COMDTINST M16114.4 (series), and the Naval Engineering Manual, COMDTINST M9000.6 (series).

# **B.2. UTB**System Center

In support of Commandant (G-OCS), the UTB Systems Center (UTBSC), located at the USCG Reserve Training Center Yorktown, is the center of excellence for the 41' UTB. In addition to training coxswains to operate the 41' UTB, the UTBSC provides the following:

- expertise in all aspects of 41' UTB operation and maintenance,
- review of the boat, its equipment and crew procedures,
- evaluation of prototype alterations, and
- 41' UTB Standardization Team.

### Chapter 1 - Introduction





### Section C. Changes

#### C.1. General

Commandant (G-OCS) promulgates this manual and its changes. Submit recommendations for corrections or changes to the UTBSC via standard letter or electronic mail. The address and phone number for the UTBSC is as follows:

Commanding Officer (tutb) U.S. Coast Guard Reserve Training Center Yorktown, VA 23690-5000

757-898-2180 or 2125

# C.2. Boat alterations (BoatAlts)

Appendix C is an index of all Boat Alterations (BoatAlts) issued since the 41' UTB has been in service. BoatAlts issued after the date of this revision supersede information in this manual where applicable.

### Chapter 1 - Introduction





### Section D. Action

#### D.1. General

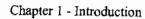
Unit and operational commanders will comply with the procedures and limitations specified in this publication and any duly issued changes.

NOTE &

To maintain fleet-wide standardization, unit commanders are not authorized to change or vary the type or location of equipment carried except where noted. Design or structural alterations are prohibited unless specifically authorized by the Office of Naval Engineering, Commandant (G-SEN).

NOTE &

Prototype testing of 41' UTB configuration changes may only be carried out with the specific authorization of the Office of Naval Engineering, Commandant (G-SEN). Under most circumstances, prototype testing is done at the UTBSC.







### **Chapter 2 Boat Characteristics**

### Overview

#### Introduction

### NOTE &

Be aware of and allow for any differences in a particular boat as compared to the standard measurements, particularly with regard to maximum operating height above water (i.e., antennas).

This chapter describes standard 41' UTB features and equipment. The chapter is organized by vessel compartment and deck areas working forward to aft. The standards maintain 41' UTB configuration and stowage. Where discrepancies exist, commands shall initiate action to comply with these standards. Many of the systems described briefly in this chapter are covered in greater detail in Chapter 3, Boat Systems and Components.

Figure 2-1 lists standard 41' UTB specifications. Figures 2-2 and 2-3 show overall boat layout. Individual compartment and deck area diagrams are included throughout the chapter.

### In this chapter

Section	Title	See Page
A	General Description	2-3
В	The Hull	2-7
С	Forepeak	2-9
D	Passenger Compartment (Excluding Pilothouse)	2-13
Е	Pilothouse	2-21
F	Main Deck	2-42
G	Mast	2-45
Н	Engine Room	2-47
I	Well Deck	2-51
J	Lazarette	2-55
K	Mooring Equipment and Fittings	2-57

### Operators Manual -41' UTB





### Section A. General Description

## A.1. Manufacturer

The Coast Guard Yard at Curtis Bay, Maryland, built 208 UTBs between 1973 and 1983. There are over 150 still in service.

#### A.2. Missions

The 41'UTB is the general workhorse at multi-mission units. It is designed to operate under moderate weather and sea conditions where its speed and maneuverability make it an ideal platform for a variety of missions.

Strategic goals supported are:

- Search and Rescue
- Maritime Law Enforcement
- Port Security
- Marine Environmental Protection
- Recreational Boating Safety
- Coxswain (UTB SYSCEN) & Aircrew (AIRSTAs) Training

#### A.3. Hull

The boat has an aluminum hull with main deck flush over the engines and a self-bailing well deck aft. It is of modified planing hull design, with a deep-V bow spreading gradually to form a wide, low-deadrise stern. A hollow skeg runs from Bulkhead 2 to just forward of the propellers at Frame 12. It slopes downward to its deepest point 4'1" below the water line at Frame 9. The entire exterior deck area is covered with non-skid to prevent slipping when deck or wet or dry.

### A.4. Cabin top

The passenger compartment and pilothouse are enclosed in a cabin of molded, fiberglass-reinforced plastic over an end-grain balsa core. Beginning at Bulkhead 2, the cabin rises vertically from the main deck and then horizontally aft and slightly upward to a point just aft of Frame 4. The forward face of the pilothouse rises vertically with a slight aft angle from the top of the passenger compartment. The pilothouse top follows aft to Frame 7.

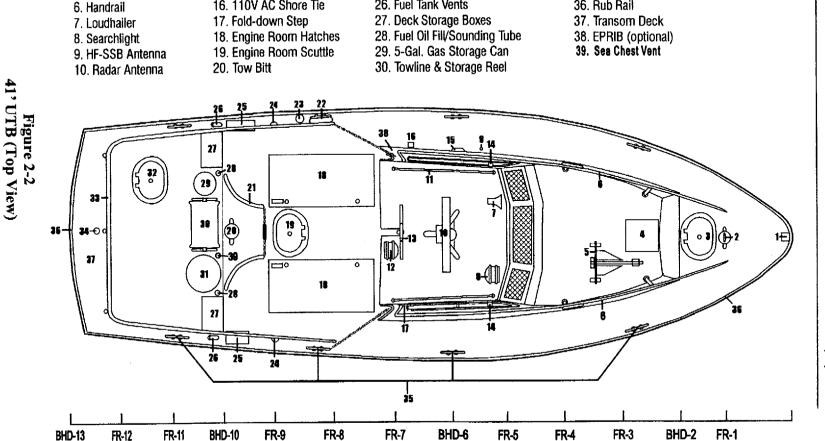
# A.5. Boat specification

Figure 2-1 lists the standard 41' UTB boat specifications.



Characteristic	Specification
Length, molded	40' 08"
Length (with rub rails)	41' 03 ¾"
Beam, molded	13' 05- ¼"
Beam (with rub rails)	14' 01"
Freeboard, bow	4' 06"
Freeboard, amidship (Frame 7)	3' 09"
Freeboard, stern	2' 09"
Draft (maximum)	4' 01"
Fixed height above water line (top of radar antenna)	13' 02"
Unfixed height above water line (top of AM antenna)	26' 8"
Mast height (top of RDF antenna)	17' 00"
Engines	Cummins Diesel Model VT-903M
Shaft horsepower, each engine	340 SHP
Fuel	#2 diesel
Fuel capacity	486.8 gallons
Fuel capacity (95% full)	463.0 gallons
Fuel, usable	420.0 gallons
Propellers	Two, 4-bladed, 26" dia. x 28" pitch
Maximum speed	26 kts
Endurance at maximum speed	10.5 hours
Range at 18 kts (2,000 RPM)	300 NM
Displacement, full load	30,000 pounds
Displacement, less cargo	26,000 pounds
Crew	3
Passengers	20

Figure 2-1 Standard 41' UTB Boat Specifications



21. Handrail/Mast Support Rail

23. Floating Electric Marker Light

22. Life Rina

24, M60 Gun Mount

26. Fuel Tank Vents

25. Main Engine Air Intake

31. Dewatering Pump Canister

32. Lazarette Scuttle

34. Flagstaff Socket

35. Deck Cleats

36. Rub Rail

33. Taffrail

11. Pilothouse Handrail

15. Fresh Water Fill & Vent

16, 110V AC Shore Tie

12. Aft Floodlight

13. Mast

14. Sidelights

1. Bullnose

5. Anchor

2. Forward Bitt

3. Forepeak Scuttle

4. Escape Hatch



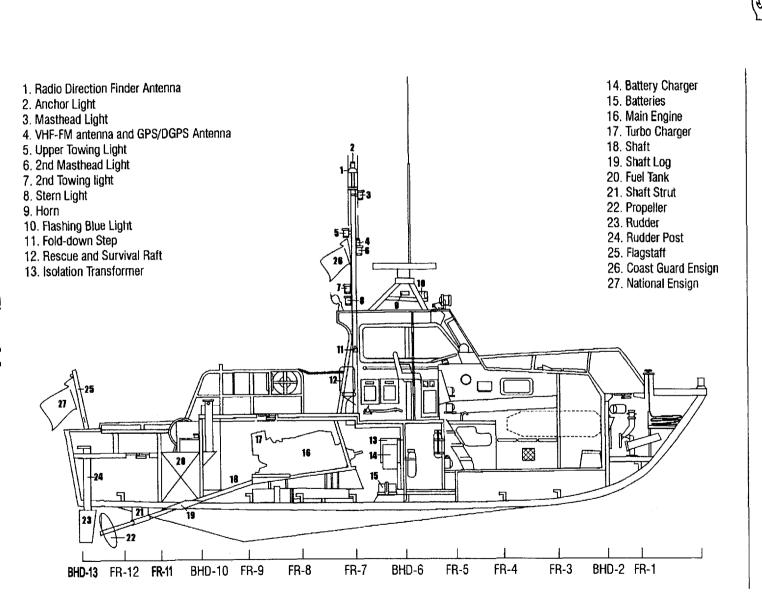


Figure 2-3 41' UTB (Side view)



### Section B. The Hull

# B.1. Construction

The aluminum hull will withstand the stresses and strains experienced by the all-purpose utility boat. The hull consists of an internal, central keel running the full length of the boat with a hollow skeg mounted externally below it. Longitudinal frames, spaced at 11" intervals, run parallel to the keel. Transverse frames, spaced at 31" intervals, connect the keel and longitudinal frames in a web-like network. The shell plate attaches to this extensive framework. Transverse frames (or the corresponding bulkhead at a frame) are numbered fore to aft and referenced to discuss compartment or equipment location.

The hull plating has three thicknesses to withstand varied stresses. Between the gunwale and chines, the plating is <sup>3</sup>/16". Between the chines and keel, the thickness is <sup>1</sup>/4", except between Frames 11 and Bulkhead 13 where <sup>5</sup>/16" plating helps to withstand stress caused by the propellers, propeller struts, and rudders.

### **CAUTION!**

The hull will **not** withstand hard contact. The exterior hull has an installed continuous fender system (rub rail) for protection. However, this **does not** relieve the operator from using standard boat seamanship skills and portable fenders to cushion any direct contact during close quarters maneuvering situations.

### **CAUTION!**

Mercury is extremely corrosive to aluminum. Do not use mercury based float switches or calibration/measuring instruments on board.

### **B.2.** Compartments

The hull has five compartments:

Compartment	Location
Forepeak (watertight)	Bow to bulkhead 2
Passenger Compartment (not watertight)	Bulkhead 2 to 6
Engine Room (watertight to main deck)	Bulkhead 6 to 10
Fuel Tank (watertight to well-deck)	Bulkhead 10 to Frame 11
Lazarette (watertight)	Frame 11 to Transom



# **B.3.** Hull reference points

Frequent use is made of the following reference points:

Frame/ Bulkhead	Reference	
BHD-2	24/28V DC docking lights are recessed into the hull, port and starboard, just forward of this point.	
	Aft edge of the Coast Guard identification 2'wide red stripe ends here on the exterior of the hull and runs diagonally aft from the main deck to the water line.	
Between BHD-6 and FR-7	The depth finder transducer penetrates the hull approximately 18" to starboard of the keel.	
FR-9	Maximum draft occurs here, below the middle stanchion of the handrails.	
BHD-10	The shafts penetrate the hull through stuffing tubes and shaft logs.	
FR-12	Shafts and propellers are supported by shaft struts installed just forward of Frame 12. The top of the propeller radius is approximately 2'below the water line.	



### Section C. Forepeak

#### Introduction

The forepeak is the first watertight compartment of the 41' UTB. This compartment extends from the peak to Bulkhead 2. This is the stowage location for the anchor line, spare anchor, and fire monitor.

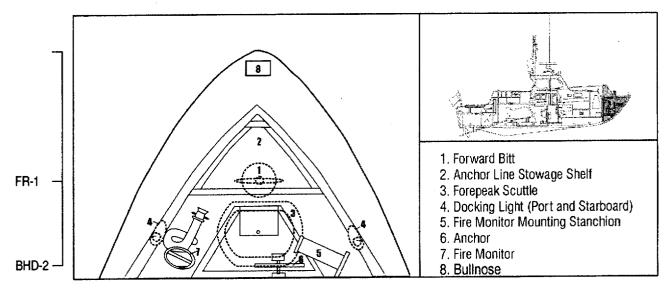


Figure 2-4 Forepeak

#### In this section

Topic	See Page
Exterior	2-10
Interior	2-11



### **Exterior**

#### C.1. Bullnose

The solid aluminum bullnose chock is bolted to the main deck at the peak of the boat. The inside surface of the bullnose may be polish to aid in line handling.

## C.2. Forward bitt

The forward bitt is a capped hollow pipe that penetrates the main deck at Frame 1 directly above the anchor locker. The anchor line chain hangs inside the bitt for easy access and ready use. A <sup>7</sup>/16" screw pin shackle attached to the chafe chain hangs from a hook on the bottom of the bitt cap cover. To use the anchor line, first remove the bitt plug by turning the T-top, and lifting the cap cover. Then, pull the chain out of the bitt, and lead it forward through the bullnose chock and back to the anchor located on the cabin top.

# C.3. Forepeak scuttle

A 19" x 26", flush-mounted, watertight scuttle located between Frame 1 and Bulkhead 2 on the main deck provides access to the forepeak. To open the scuttle, use either the handle from inside or the T-wrench (located in the starboard deck storage box) from outside.

# C.4. Forward deck handrails

A handrail constructed of 1 ¼" schedule 40 aluminum pipe is bolted to the main deck just port and starboard of centerline. A bedding compound is used between the fiberglass cabin top and the metal handrail. They begin at Frame 1, even with the forward bitt. The handrails rise to a level 36" above the deck and continue aft, following the line of the deck along each side of the pilothouse. At the aft end of the pilothouse, the handrails curve upward along the aft vertical edge, ending at a height even with the top of the side windows.



### Interior

### C.5. Anchor line

The anchor line (300' of 2 ¾" double-braided nylon line) is stowed inside the forepeak on an expanded metal shelf just forward of Frame 1. Nine feet of ½" galvanized BBB chafe chain is attached to the anchor line by a 5/8" screw pin shackle and ½" swivel. A 7/16" screw pin shackle at the end of the chain connects to the anchor. The bitter end of the anchor line is attached to a staple (attached to the central keel) with a small line.

#### C.6. Anchor

The spare anchor is stowed inside the forepeak on brackets attached to Bulkhead 2. The shank of the anchor fits into a socket welded to the bulkhead. A shock cord is used to hold the anchor in the bracket.

#### NOTE &

Replacement anchors are 25 pounds. Modifications must be made to mounting brackets to accommodate the larger anchor.

### C.7. Fire monitor

The fire monitor is inside the forepeak on brackets on the port side of the hull. Its mounting stanchion hangs on a bracket on the starboard side of the hull, just forward of Bulkhead 2. The forward bitt is fitted to receive the fire monitor mounting stanchion by removal of the bitt cap cover and insertion of the mounting stanchion.

### C.8. 24V docking lights

The docking lights are just below the gunwale in both sides of the hull shell plate between Frame 1 and Bulkhead 2.

### C.9. Compartment lighting

There is one light in the forepeak compartment. The white light is located over the anchor line, forward of the bitt.

### Chapter 2 - Boat Characteristics





## Section D. Passenger Compartment (Excluding Pilothouse)

#### Introduction

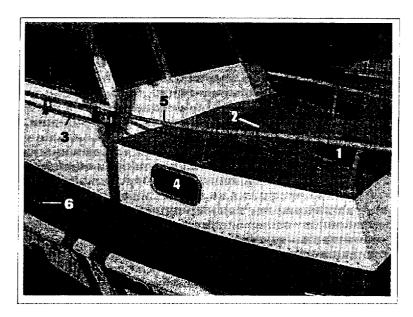
The passenger compartment is the primary stowage location for boat outfit equipment. It also serves as an area to bring survivors. It extends from Bulkhead 2 to Bulkhead 6 and includes the head, berth seating area and stowage area.

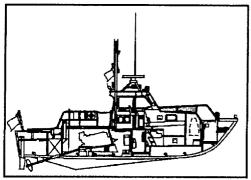
#### In this section

Торіс	See Page
Exterior	2-14
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### **Exterior**





- 1. Head Escape Hatch
- 2. Anchor
- 3. Boat Hook
- 4. Cabin Fixed Window
- 5. Handrail
- 6. Cleat

Figure 2-5
Cabin Top and Foredeck

#### D.1. Cabin top

Generally speaking, the cabin top is the area from Bulkhead 2, where the cabin top attaches to the hull, to the front windshield and the pilothouse area. But in fact, the cabin top, including the pilothouse, is one solid fiberglass over end-grain balsa shell (See Section 2.A.4.). The cabin is bolted to the deck at the deck combing. The gelcoat is colored yellow on the interior surface, white on the exterior sides, and gray on the exterior horizontal surfaces.

### D.2. Emergency escape hatch

An emergency escape hatch is in the cabin top. It leads out from the head space. (Also see Section 2.D.11.)

#### D.3. Anchor

A 22 or 25-pound Danforth anchor is on the cabin top, starboard side, approximately 28" forward of the pilothouse windshield.

#### D.4. Handrails

Handrails lead aft, over the cabin top and are bolted through the fiberglass. (Also see Section 2.C.4.)



D.5. Windows	There is a fixed window on each side of the cabin just above the main deck between Frames 3 and 4.
D.6. Cleats	(See Section 2.K.1.)
D.7. Boat hooks	(See Section 2.E.16.)



### Interior

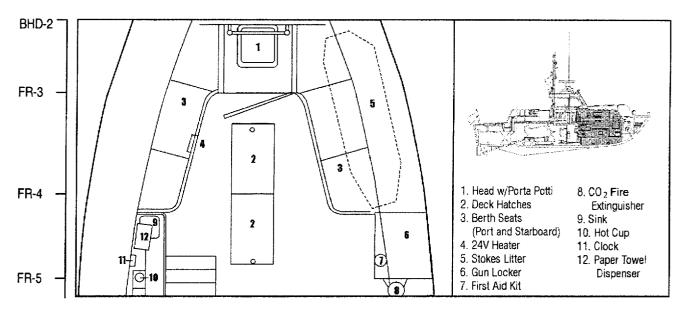


Figure 2-6
Passenger Compartment

#### D.8. Deck

The deck of the passenger compartment is fiberglass reinforced plastic over a 1" end-grain balsa core, overlaid with marine-grade carpet.

#### D.9. Bulkheads

The forward bulkhead and hull sides are encased in Ensolite thermal insulation covered by wood-grain paneling. The aft bulkhead separating the passenger compartment and engine room is not insulated or covered.

#### D.10. Head

The head is completely self-contained and enclosed for privacy. A portapotti is secured by strap belts on the centerline forward. A 23" handrail is attached to the forward cabin top above it. A toilet paper holder is on the port bulkhead.

### D.11. Emergency escape hatch

The emergency escape hatch is directly above the porta-potti. It is hinged forward and has quick-release operating handles.

#### NOTE &

The emergency escape hatch must be secured and unobstructed at all times. Nothing will be stowed in the head in addition to the porta-potti.



#### D.12. Deck hatches

Two 21" x 33" deck hatches are just aft of the head door, between Frames 3 and 5. These hatches provide inspection and maintenance access to the passenger compartment bilge.

### D.13. Berth seats

The berth seats have molded fiberglass frames with marine plywood panels. Four-inch foam cushions covered with naugahyde conform to the hull interior shape on both sides of the cabin. The plywood berth seat panels lift off for access to boat outfit item storage areas. The items stowed within the seat storage areas are listed in Appendix A.

#### D14. Heater

This heater is installed inside the port berth seat. It runs off coolant water from the port engine and has a 24 V DC electric fan. It is used while underway with main engines running.

### D.15. Stokes Litter

The litter is stowed above the starboard berth seat against the hull on mounting brackets.

**D.16.** Handrails A 64" stainless steel handrail is mounted to the passenger compartment overhead, parallel to the starboard cabin side. A second handrail is on the port side, which leads aft and out of the compartment.

#### **D.17.** Gun locker

The gun locker is located just aft of the starboard berth seat. The secure gun rack mounted inside is authorized to hold one M-16 rifle, one shotgun, one 9MM pistol, and one M60 machine gun (butt stock).

#### D.18. First aid kit

This ten-person kit is on the starboard side of the passenger compartment, directly above the gun locker.

### D.19. $CO_2$ fire extinguisher

A 5-pound CO<sub>2</sub> fire extinguisher is mounted on the aft bulkhead of the gun locker.

#### D.20. Sink area

A fiberglass sink is on the port side, aft of the berth seat. A hand pump supplies fresh water from a 20-gallon tank mounted on Bulkhead 6. Two hotcup units are above and aft of the sink. A paper towel dispenser is mounted above the sink.

#### NOTE &

The sink drain valve is located directly below the sink. It must be closed except when actually using the sink to maintain watertight integrity.

#### D.21. Clock

A 24-hour clock is mounted above the sink area just aft of the paper towel dispenser.



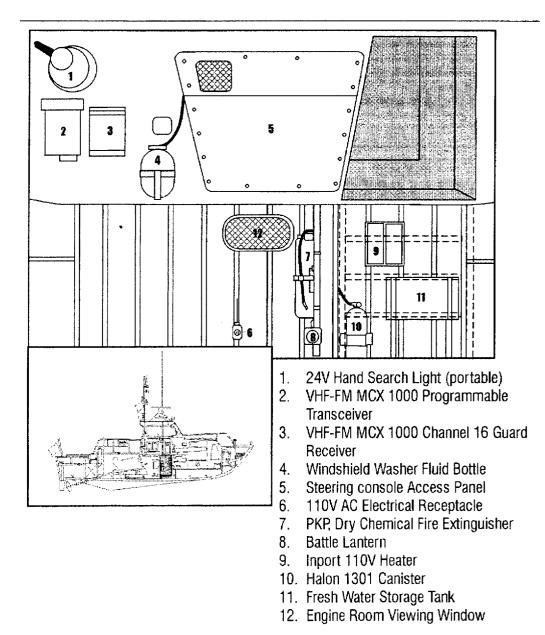


Figure 2-7
Passenger Compartment Stowage Area/Aft Bulkhead

## D.22. Steering console access panel

The access panel is centered above the recessed storage area on the forward bulkhead of the pilothouse. This panel provides access to the steering controls, Morse throttle controls, and electrical cable runs for the steering console instrument clusters.



## D.23. 24V hand-held searchlight

The portable searchlight is in a special bracket on the forward side of the coxswain console, to starboard of the steering console access panel.

### D.24. VHF-FM DES transceiver

The VHF-FM DES transceiver is mounted on the forward side of the coxswain console, to starboard of the steering console access panel.

### D.25. VHF-FM guard receiver

The VHF-FM guard receiver is mounted on the forward side of the coxswain console, inboard of the VHF-FM DES transceiver.

# D.26. Windshield washer fluid bottle

The reservoir bottle is mounted on the forward side of the pilothouse bulkhead, to starboard of the steering console access panel.

## D.27. Wooden ladder

The wooden ladder is located on the port side, fastened both top and bottom. It provides access between the pilothouse and the passenger compartment.

### WARNING 💖

The ladder treads will have non-skid material applied. Carpeting shall not be used on the ladder.

### D.28. Stowage area

A recessed, athwartship stowage area is just aft of the passenger compartment deck and under the steering console access panel. It extends 36" under the pilothouse deck to Bulkhead 6. In addition to the following mounted items, there is ample space for boat outfit stowage (See Appendix A for a complete listing).

Item	Location in Stowage Area
HF-SSB Tuner	On the sink aft panel.
110V AC Electrical Receptacle	Bulkhead 6, below and to starboard of engine room viewing window.
Dry Chemical (PKP) Fire Extinguisher (10-lb.)	On the pilothouse support stanchion (after side, 21" off deck) to port of the centerline.
Battle Lantern	On the stanchion, 3" above the deck. Directed toward the head door.



Item	Location in Stowage Area
110V AC Electric Heater	On Bulkhead 6 between Logitudinals 3 and 4. This heater is for inport using shore power.
12V Battery Equalizer	On Bulkhead 6 amidship, above the batteries. It provides power to the 12V DC power panel in the pilothouse.
HALON 1301 Canister	Bulkhead 6, port side between Longitudinals 2 and 4.
Freshwater Storage Tank	In brackets on Bulkhead 6, Longitudinals 4 and 5, port side.
Engine Room Viewing Window	Bulkhead 6 amidship for visual checks of the engine room.
Bilge Pump (passenger compartment bilge)	Just forward of Bulkhead 6 on the starboard side between the keel and Longitudinal 1. BoatAlt 44 allows installation of a clear plastic, 6" access plate directly over the pump. (See Figure 3-11.)
Float Switch	To port side of the keel. This activates the passenger compartment bilge alarm. (See Figure 3-11.)
Overboard Discharge Hose and Spring Valve	This hose with valve runs from the bilge pump to a hull outlet above the waterline. (See Figure 3-11.)
Compartment Lighting	<ul> <li>Two white lights in stowage area.</li> <li>Two white lights in main compartment.</li> <li>One red light in main compartment.</li> <li>One white light in head.</li> </ul>



### Section E. Pilothouse

#### Introduction

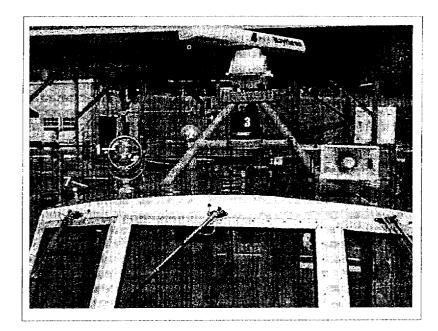
The 41' UTB is operated from the pilothouse. This deck-level weather tight area houses most of the navigation and communication equipment. It extends from the three-paneled forward windshield, just aft of Frame 4, to the pilothouse door.

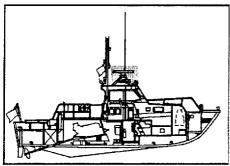
#### In this section

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### **Exterior**





- 1. Main Searchlight
- 2. Aft Spotlight
- 3. Blue Light
- 4. Radar Antenna
- 5. Radar Antenna Pedestal
- 6. Loudhailer Speaker
- 7. Handrail

Figure 2-8
Pilothouse Top

#### E.1. Windows

The pilothouse has <sup>3</sup>/8" tempered glass windows on all four sides. The forward windshields are three fixed sections in individual, anodized aluminum frames. Each window has an independently-controlled combination wiper and washer arm. The port and starboard side windows have movable sections that slide aft. There is a sliding window on the after bulkhead of the pilothouse, extending from the centerline to the starboard side.

### E.2. Main searchlight

The searchlight is located on the starboard side, forward. It can rotate through 360°.

### E.3. Aft floodlight

The aft floodlight is located on the starboard side, 24" off centerline.

## E.4. Rotating blue light

The blue light is mounted on the radar tripod, center shelf, forward. It is a rotating blue light.



#### E.5. Horn

The horn is mounted on the radar tripod, center shelf, aft of the blue light (See Figure 2-3).

### E.6. Radar antenna

The radar antenna is mounted on the radar tripod, top shelf. It is a rotating antenna.

### E.7. Radar tripod

The aluminum tripod with shelf is located on the centerline. It supports the marine radar transceiver, blue rotating light and horn.

### E.8. Loudhailer speaker

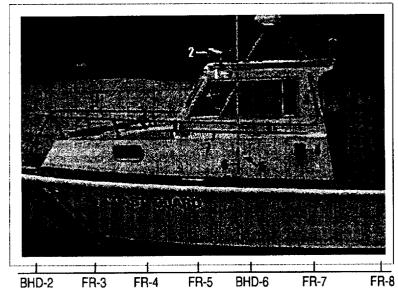
The loudhailer speaker is mounted on the forward port corner of the pilothouse top. It should rotate approximately 350°.

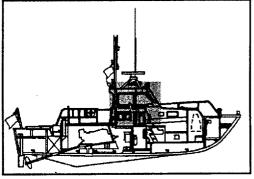
### E.9. Pilothouse top handrails

The two 62" long, 1" diameter stainless steel handrails run fore and aft along both sides of the pilothouse top. They are 3' off centerline and follow the contour of the pilothouse.

### E.10. Side handrails

The forward deck handrails continue aft along the side of the pilothouse ending at a height even with the window. (Also see Section 2.C.4.)





- 1. Side Running Light
- Loudhailer Speaker
- 3. EPIRB Location (optional)
- 4. Shore Tie Receptacle
- FR-8 5. Fresh Water Fill and Vent
  - 6. HF-SSB Radio Antenna
  - 7. Boat Hook

Figure 2-9
Pilothouse Port Side



### E.11. Side running lights

The side running lights are mounted to the pilothouse exterior side bulkheads, above each side window, 13" from the leading edge of the pilothouse top, port and starboard.

## E.12. EPIRB (optional)

The optional Emergency Position Indicating Radio Beacon (EPIRB), if installed, is mounted on the exterior port side of the cabin, aft of the window and forward of the vertical handrail.

### E.13. Shore-tie receptacle

The 110V AC shore-tie receptacle is located aft of the water fill outlet. It provides a connection for shore power.

## E.14. Freshwater fill outlet/ vent

The freshwater fill, located midway on the port side, is connected by piping to the 20-gallon freshwater tank located in the passenger compartment stowage area, port side.

### E.15. HF-SSB radio antenna

The HF antenna base-mounting bracket is welded to the main deck, port side, midway forward on the pilothouse. A hinged bracket welded to the aluminum handrail holds the antenna upright. The antenna can be folded aft or forward by releasing the bracket.

### E.16. Boathooks

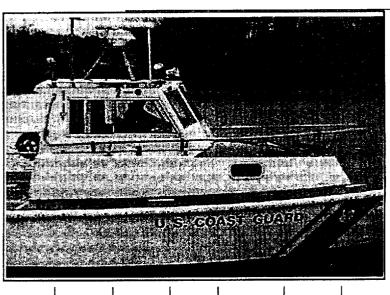
FR-7

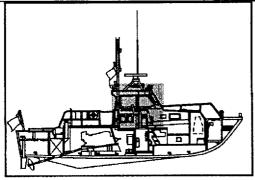
BHD-6

FR-5

FR-4

Starting at a point even with the side windows and extending aft, two wooden-handled boat hooks are suspended from the aluminum cabin mounted handrails (forward deck handrails), port and starboard side, by leather straps. The boat's number is engraved into the handle.





- 1. Fold-down Step
- 2. Side Running Light
- 3. Boat Hook

Figure 2-10 Starboard Side View of Pilothouse

BHD-2

FR-3



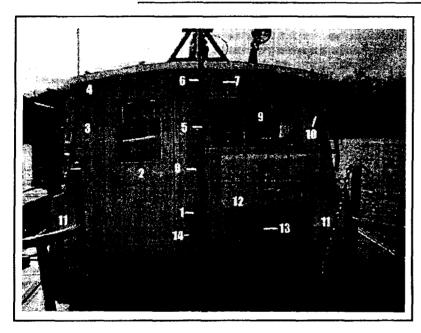
E.17. Fold-down step

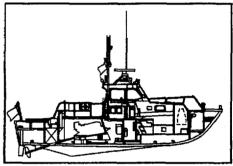
A fold-down step is bolted to the starboard side forward of the handrail and aft of the window. It assists in accessing to the pilothouse top.

E.18. Side running light

(See Section 2.E.11.)

E.19. Boat hook (See Section 2.E.16.)





- 1. Mast Junction Box
- 2. Weathertight Door
- 3. RADHAZ Marking
- 4. Exterior Bell Mount
- 5. Mast
- 6. Mast Bracket
- 7. Portable Spotlight Receptacle
- 8. Cleat
- 9. Sliding Rear Window
- 10. Spanner Wrenches
- 11. Engine Room Exhaust Vent
- 12. Rescue Raft
- 13. Tri-gate
- 14. Stuffing Tubes

Figure 2-11
Pilothouse Aft Bulkhead

E.20. Mast junction box

The mast has a junction box 12" from the bottom, a drain hole at the bottom, and a ground strap (welded or bolted to the mast and cabin).

E.21. Door

The compartment access door is in the aft bulkhead to port of the centerline. This door (with window) is weathertight but not watertight. It measures approximately 27" by 63".



### E.22. RADHAZ marking

The warning label indicating the hazards of transmitting over the AM radio.

### E.23. Bell bracket

The bracket for the boat's bell (when in use) is outboard of the door on the aft upper bulkhead.

### E.24. Mast pad eye

The mast has one pad eye permanently installed on top of the mast, aft of the flag halyard (not pictured).

## E.25. 24V spotlight receptacle

This receptacle provides power for the hand-held 24V spotlight. It is on the aft bulkhead above the window.

#### E.26. Cleat

There is a 4" cleat mounted to the port side of the mast approximately 30" above the deck for securing the flag halyard.

### E.27. Sliding rear window

Mounted in the aft bulkhead of the pilothouse, starboard side of centerline. One section slides open to starboard.

### E.28. Spanner wrenches

Two aluminum spanner wrenches are installed in a mounting bracket on the starboard aft flare of the pilothouse.

## E.29. Engine room exhaust vents

These vents are part of the aft pilothouse bulkhead at main deck level, port and starboard outboard.

## E.30. Rescue and survival raft

The four or six-person raft is on a shelf on the aft starboard side of the pilothouse bulkhead. The shelf is shimmed away from the bulkhead with ¼" aluminum stock. The raft is held to the shelf by one horizontally secured shock cord. There is also a "weak link" connection to the boat. It must be manually deployed to float free in the event of a casualty.

### WARNING 💖

Keep the raft uncovered and free of any obstructions that could prevent the raft from floating free in event of a casualty.

### NOTE &

A certified inspection agent must inspect and repack the raft annually. Indicate the inspection date and results in the Boat Record Book and on the raft container.



## E.31. Fire main riser and trigate

The riser is a 2  $\frac{1}{2}$ " water supply pipe rising vertically from the deck, just aft of the pilothouse, starboard of the centerline. The attached tri-gate with two 1  $\frac{1}{2}$ " and one 2  $\frac{1}{2}$ " hose fittings, is threaded onto the riser. (Also see Section 3.C.6. and Section 3.C.7.)

### E.32. Stuffing tubes

Stuffing tubes for all mast-mounted electrical and electronic hardware are in the aft pilothouse bulkhead, approximately on centerline near deck level.



### Interior

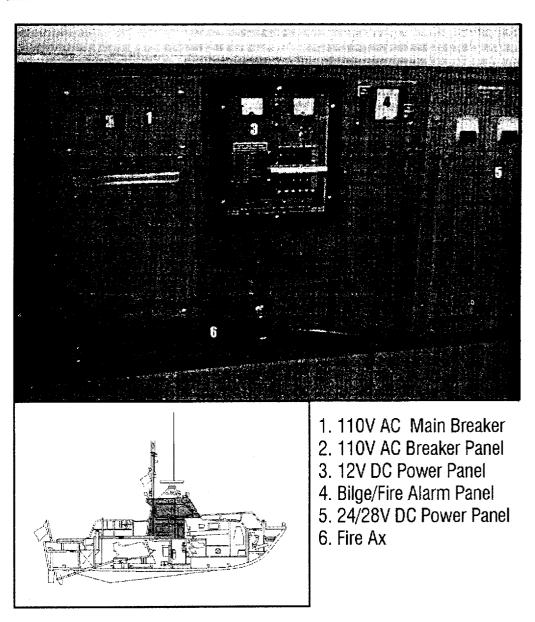


Figure 2-12
Pilothouse Interior Port Side

E.33. Deck

The deck of the pilothouse is ¾" marine plywood on aluminum framework overlaid with marine-grade carpet.



#### E.34. Paneling

The port bulkhead is paneled with Provincial Cherry wood-grain Formica paneling. It is installed below window level from the pilothouse door down through the ladder/stair well area. The Formica is glued to plywood, and screwed onto the bulkhead. This paneling is also used on the inboard and aft bulkheads of the head, as well as in the gun locker.

### E.35. 24/28V DC power circuit breaker panel

The 24/28V DC power circuit breaker panel is on the port bulkhead forward of the bilge/fire alarm panel. It receives power from the batteries and regulates all power necessary to operate the boat's systems, except for electronics. The panel has a voltmeter (left side of panel) for measuring battery voltage and an ammeter (right side of panel) for measuring the total amperage load on the system. (Also see Figure 3-14 for a close-up view of the panel and Section 3.G.8.)

## E.36. 110V AC circuit breaker panels

Two breaker panels are on the port bulkhead. They regulate power from the shore-tie cable while the boat is moored and supply power to the engine hot starts, battery charger, heater, and receptacles. (Also see Figure 3-15 for a close-up view of the panel and Section 3.G.9.)

## E.37. 12V DC circuit breaker panels

The 12V DC power circuit breaker panel is on the port bulkhead between the Bilge/Fire Alarm Panel and 110V AC panels. It receives power from the batteries through a battery equalizer and supplies power to all the electronic gear, when the boat is operating with the shore-tie removed. On the left side of the panel there is a voltmeter for measuring battery voltage and on the right side of the panel an ammeter for measuring the total amperage load on the system. (Also see Figure 3-16 for a close-up view of the panel.)

### E.38. Bilge/ fire alarm panel

The bilge/fire alarm panel monitors bilge sensors in the forward cabin and engine room bilge and a smoke detector in the pilothouse. When a problem occurs it activates the boat's horn and blue light. It receives power from the 24-volt power panel and is on the port bulkhead aft of the 24-volt power panel. (Also see Figure 3-17 for a close-up view of the panel.)

#### E.39. Handrails

The pilothouse interior has four 1" stainless steel tubing safety handrails. The port side handrail runs between the pilothouse and passenger compartment (not shown in figure). When the handrail enters the passenger compartment, the attachment points change from the port bulkhead to the overhead. This allows the handrail to serve as a guide in foul weather and also for egress in the event of capsize. The pilothouse handrails are summarized below:



Item	Location
Starboard Side	27" from the aft bulkhead, approx. 12" below the sliding window (32 ½" long)
Port Side	3" from aft bulkhead, 39" above the deck. It runs forward 72", and then down into the passenger compartment
Aft bulkhead	10" from the door (18" long)
Pilothouse Overhead	Centered, positioned 26" from the aft bulkhead, running athwartship (56" long)

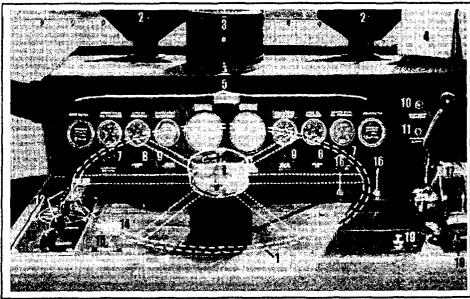
### E.40. Fire ax

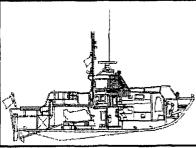
The fire ax with pick-head cover is located immediately below the 110V AC breaker panel.

### E.41. Window

(Not pictured) (See Section 2.E.1.)







- 1. Morse Steering Wheel
- 2. Defroster Ducts
- 3. 5" Marine Compass
- 4. Depth Finder
- 5. Gauges (Port and Starboard Engines) (Reference Fig. 2-14)
- 6. Alarm Cut Out Switches
- 7. Alternator Warning Light
- 8. Main Engine Lube Oil Low Pressure Warning Light
- Main Engine Fresh Water High Temperature Warning Light
- 10. Halon Alarm Test Button
- 11. Defroster Booster Blower Switch
- 12. Electrical Control Panel (Reference Fig. 3-13)
- 13. Compass and Main Engine Gauge Dimmer Switches (Reference Fig. 3-13)
- 14. Windshield Wiper Switches
- 15. Windshield Washer Pump Switch
- 16. Engine Stop Cables
- 17. Main Engine Morse Throttle Controls
- 18. Main Engine Start Buttons
- 19. Horn Button

Figure 2-13
Steering Console



# E.42. Centerline steering console & console hood

The centerline console and console hood contain the majority of the boat operating controls and gauges. The console is located in the forward pilothouse on Frame 5. The centerline steering console consists of:

<b>NOTE</b>	<i>6</i> -

If compass deviation is greater than 5° and cannot be corrected, the compass shall be overhauled and/or replaced.

Item	Location
Steering Wheel	A 20" diameter, nonmagnetic, stainless steel, Morse steering wheel is located amidship on the steering console top.
Defroster Ducts	The duct work is on the pilothouse forward bulkhead and forward top of console hood. The defroster heads focus on all three fixed forward windshields.
Compass	A 5" marine compass is on the console hood, on centerline. A red compass light is attached for night visibility. (See Figure 3-13)
Depth Finder	The depth finder is to the right of the compass on top of the console hood. (Also see Section 3.G.18.)
Gauges	(See Section 2.E.43.)
Alarm Cut-Out Switches	The alarm cut-out switches beneath each tachometer control the engine alarm bells. They <b>must</b> remain on at all times, except when the electrical circuits are energized and the main engine is secured.
Alternator Light	The alternator light is below the Marine Gear Oil Pressure gauge. It comes on when the alternator is not charging the batteries.
Warning Lights	Located directly below the Lube Oil Pressure and Circulating Water Temperature gauges. They also indicate abnormal operating conditions.
HALON 1301 Alarm Horn Test Button	This button is outboard of the starboard engine hour counter.
Defroster Booster Blower Switch	Outboard of the starboard engine hour counter and directly below the Halon 1301 horn test button.
Electrical Control Panels	On the forward, port side of the steering console. This panel has a rotary control switch for the navigation lights and rocker switches for the docking lights, aft floodlight, and blue light. (Also see Section 3.G.6. for a detailed description and Figure 3-13 for a close-up view of the panel.)



Item	Location
Compass and Main Engine Gauge Dimmer Switches	The compass light dimmer is located aft on the electrical control panel. The engine gauge dimmer is the aft most rotary rheostat. (See Figure 3-13.)
Windshield Wiper Switches	On the port side of the steering console, inboard of the light switches for each wiper motor.
Windshield Washer Pump Switch	Just aft of the windshield wiper switches is the windshield washer pump switch.
Bilge Pumps Control Switches	On the forward most section of the electrical control panel. (See Figure 3-13 for a close-up of the panel.)
Engine Stop Cables	Starboard and forward of the wheel, 8" and 12" off the centerline, are T-handled cables that shut off fuel to the engines.
When the engines are not running the engine stop cables must always be in the upposition. This prevents fuel leakage past the injector nozzle into the cylinders, which may cause a hydraulic lock of the engine.	
Main Engine Throttle and Drive (Morse) Controls	On the starboard side of the steering console.

### **CAUTION!**

Main Engine
Throttle and Drive
(Morse) Controls

Main Engine Start
Buttons

On the steering console aft of the Morse Controls.
They activate the 24V DC starting motors. A metal shield protects the buttons from accidental pushing and possible damage to the engine starters.

Horn Button

On the steering console, inboard of the starter buttons.



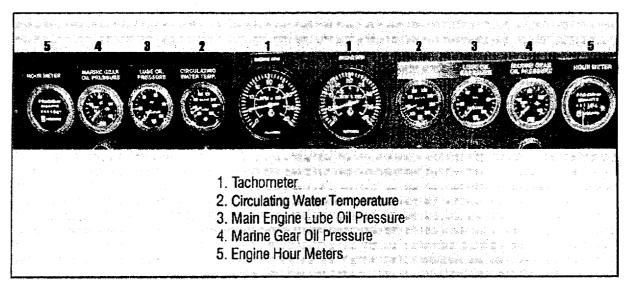


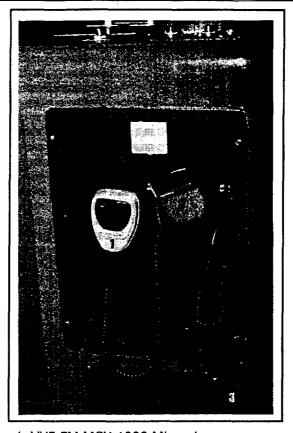
Figure 2-14
Close-up of Steering Console Gauges

### E.43. Gauges

On a vertical facing plate under the overhanging console hood are a series of gauges to monitor each main engine. The gauge package for each main engine starts at the center (tachometer) and works outboard representing the respective main engine in the following order:

Gauge	Function
Engine RPM (Tachometer)	Indicates revolutions per minute (RPM) for the engine. Normal idle is 700 to 725 RPM. Maximum allowable RPM is 2700. Maximum continuous duty speed is 2300 RPM. Red line marking is at 2700 RPM.
Circulating Water Temperature Gauge	Indicates temperature in the jacket water cooling system. Normal operating temperature range is 165° to 195°F indicated by green marking.
Lube Oil Pressure Gauge	Indicates pressure of lubricating oil within the engine. Pressure at idle should be 10 - 30 psi, increasing to 40-65 psi at cruising, with a minimum allowable pressure of 30 psi indicated by red marking.
Marine Gear Oil Pressure Gauge	Indicates the lube oil pressure in the marine gear. The pressure at idle should be approximately 25 to 70 psi, increasing to 190 to 220 psi at cruising speed indicated by green markings.
Engine Hour Counter	An "odometer" type gauge that counts the hours of engine operating time.





- 1. VHF-FM MCX-1000 Microphone
- 2. Ray-430 Loudhailer Microphone
- 3. Boat Plate

Figure 2-15 Steering Console Face

E.44. Steering console (face)

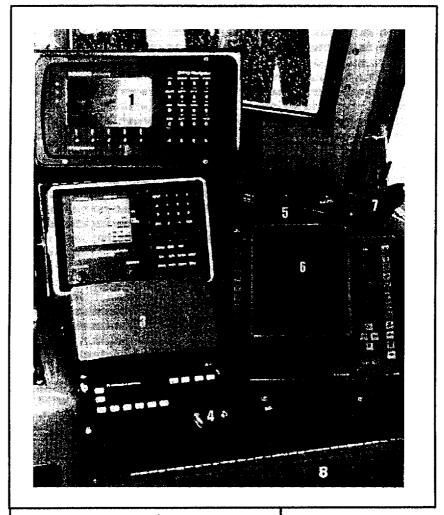
The following items are located on the face of the steering console. This area is located directly below the starter buttons.

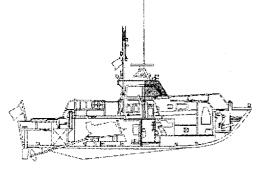
Item	Location
VHF-FM microphone	Recessed in the face of the steering console, used for transmitting over the VHF radio.
Loudhailer microphone	Recessed in the face of the steering console, used for speaking over the loudhailer and activating the siren.
Boat plate	On the steering console, below the microphones. The brass plate indicates the hull number, manufacturer, crew size, displacement, maximum passengers, maximum load, and year of construction of the boat.



E.45. Helmsman's chair

Centered just aft of the steering console on a pedestal stand is the adjustable helmsman's chair. The padded chair with armrests is designed to swivel, move fore and aft, and up and down for the helmsman's personal comfort.





- 1. MX-200 DGPS
- 2. VHF-FM Radio Direction Finder
- 3. Ray-430 Loudhailer
- 4. VHF-FM MCX-1000 Control Head
- 5. Binocular Stowage
- 6. AN/SPS-69 Surface Radar
- 7. Chart Light
- 8. Chart Table (folded down)

Figure 2-16
Electronics Console



### E.46. Electronics console

The electronics console is to the right of the steering console. It houses the majority of the electronic navigation instruments. The contents of the console are discussed in Sections 3.G.15, 3.G.16, 3.G.17, and 3.G.19

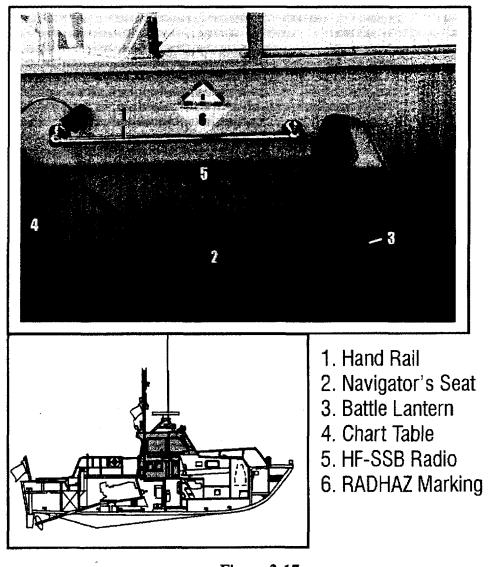


Figure 2-17
Pilothouse Interior Starboard Side

### E.47. Navigator's seat

The Navigator's seat is located on the starboard side between the helmsman's chair and the starboard bulkhead off the deck. This seat is nonadjustable.

## E.48. Battle lantern

The battle lantern is located on the starboard bulkhead just below and aft of the navigator's seat. (Not pictured)



### E.49. Chart table

The Navigator's seat is located on the starboard side between the helmsman's chair and the starboard bulkhead off the deck. This seat is nonadjustable.

### E.50. HF-SSB radio with microphone

The HF radio is located on the starboard bulkhead adjacent to the navigator's seat, and under the handrail.

### marking

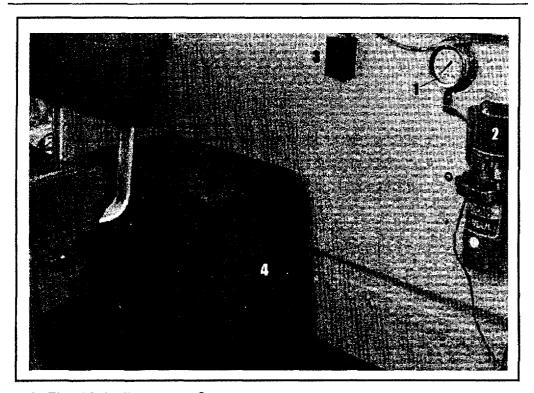
**E.51. RADHAZ** The radiation hazard sticker is on the bulkhead above the HF radio (Type 5).

E.52. Handrails

(See Section 2.E.39.)

#### E.53. Window

(See Section 2.E.1.)



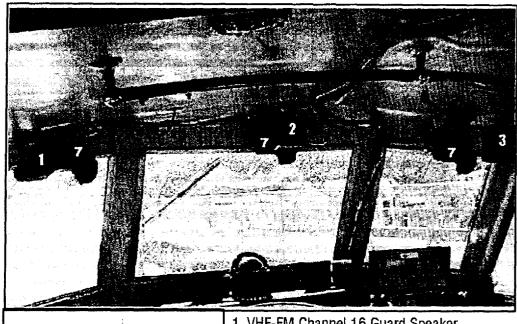
- 1. Fire Main Pressure Gage
- 2. Dry Chemical Fire Extinguisher
- 3. 110VAC Outlet
- 4. Storage/Bench Seat

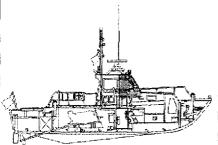
Figure 2-18 Pilothouse Interior Aft Bulkhead



E.54. Door	(Not pictured) (See Section 2.E.21.)
E.55. Fire main pressure gauge	The fire main pressure gauge is located on the aft bulkhead, inboard of the PKP fire extinguisher.
E.56. Dry chemical (PKP) fire extinguisher	The second PKP on board the boat is located on the aft bulkhead just inboard of the door hinge. The other is located in the passenger compartment stowage area.
E.57. 110V AC outlet	The outlet is located below the aft window outboard of the fire extinguisher.
E.58. Bench seat	The padded bench seat is mounted in the back starboard corner against aft bulkhead. The top opens to hold navigational publications and equipment.
E.59. Bell	When not in use, the bell is mounted in the pilothouse on the aft bulkhead, port side, outboard of the door. (Not pictured)
E.60. Handrails	(Not pictured) (See Section 2.E.39.)
E.61. Window	(Not pictured) (See Section 2.E.1.)







- 1. VHF-FM Channel 16 Guard Speaker
- 2. Direction Finder Speaker
- 3. VHF-FM Transceiver Speaker
- 4. Searchlight Handle and Switch
- 5. Loudhailer Directional Handle
- 6. Space Lighting
- 7. Wiper Motors

Figure 2-19 **Overhead Pilothouse** 

E.62. VHF-FM channel 16 guard speaker

The VHF-FM Channel 16 guard speaker is on the overhead, forward, port corner.

E.63. Direction finder speaker

The DF speaker is on the overhead, forward, centerline.

E.64. VHF-FM transceiver speaker

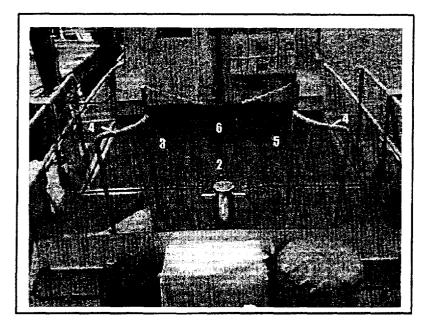
The VHF-FM transceiver speaker is on the overhead, forward, starboard corner.

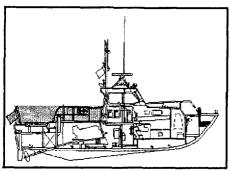


E.65. Searchlight handle and switch	The searchlight handle and switch are on the overhead in the forward, starboard corner. The handle controls the searchlight aim through 360 degrees. A rotary on/off switch is just aft of the handle.	
E.66. Loudhailer directional handle	The loudhailer handle is on the overhead in the forward, port corner. The handle controls speaker direction through 350 degrees.	
E.67. Space lighting	The one red light is mounted in the overhead just port of centerline, aft of the handrail.	
E.68. Smoke detector	The smoke detector is mounted in the overhead, centerline, to starboard of the space lighting. (Not pictured)	
E.69. Handrail	The overhead handrail is available to assist crew and passengers with stability during underway operations. (Also see Section 2.E.39.)	
E.70. Windshield wiper motors	There is a 24V DC wiper motor located above each of the three forward fixed windows which connects to exterior wipers through the cabin top.	



### Section F. Main Deck





- Tow Bitt
- 2. Engine Room Scuttle
- 3. Port Engine Hatch
- 4. Mast Support Rail
- 5. Stbd Engine Hatch
- 6. Softpatch

Figure 2-20
Main Deck (Aft of Pilothouse)

#### F.1. General

The main deck area aft of the pilothouse contains a variety of equipment and fittings to support the boat's missions. This section includes the area aft of the pilothouse (at Frame 7) to the well deck (Bulkhead 10).

#### F.2. Tow bitt

The tow bitt is 6" forward of Bulkhead 10, main deck, centerline. It is made of schedule 80 aluminum pipe. It may be polished to allow smoother operation when tending a tow.

#### F.3. Cleats

(See Section 2.K.I.)

### F.4. Engine room scuttle

A 19" x 26", flush-mounted, watertight scuttle, on centerline just forward of Frame 9. It provides access to the engine room. The scuttle is opened using the hand lever from the inside or the T-wrench from the outside.

## F.5. Mast support handrails

A pair of aluminum mast support/handrails with safety chain (chain covered 7" - 12" by chafing gear) are just aft of Frame 9, to port and starboard of the towing bitt.



### F.6. Main engine hatches

A 4'x 6' watertight hatch with spring-loaded hinges and flush-mounted dogs is over each engine. The hatches open from the main deck only, using the T-wrench.

### NOTE &

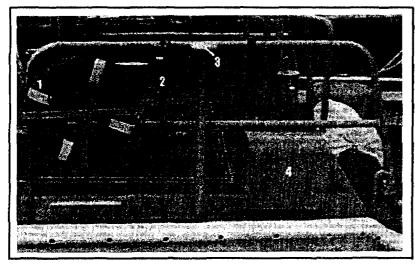
Inspect the hatches regularly and keep them watertight. Leaks can flood the turbocharger intakes and damage the engine.

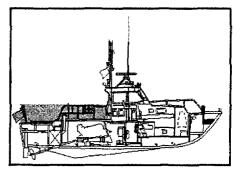
### **CAUTION!**

When opening the engine hatches, be sure the safety latches adjacent to each hinge are in the secure position before releasing the hatch. Likewise, be sure the safety latches are disengaged (pulled inboard) before closing the hatches. Failure to do so may bend the hatch hinges.

### F.7. Soft patch

The soft patch is a removable section of the deck provided for access when removing or installing engines.





- 1. Life Ring Bouy
- 2. Float Light
- 3. M-60 Gun Mount
- 4. Engine Room Intake Vent

Figure 2-21 Main Deck Port Side

### F.8. Main deck handrails

There are handrails welded to the main deck along the outside perimeter from Frame 8 to midway between Bulkhead 10 and Frame 11. A detachable safety chain fitted with a D-ring and shackles connects the after end of the pilothouse handrail to the forward part of the main deck handrail, port and starboard.

## F.9. Ring buoy and floating marker light

A 24" ring buoy rests in brackets welded to the outboard side of the port handrail. The battery operated marker light rests in a fitted bracket, outboard and aft of the ring buoy. The bracket is bolted to a base plate on the handrail.



## F.10. M-60 machine gun mount bracket

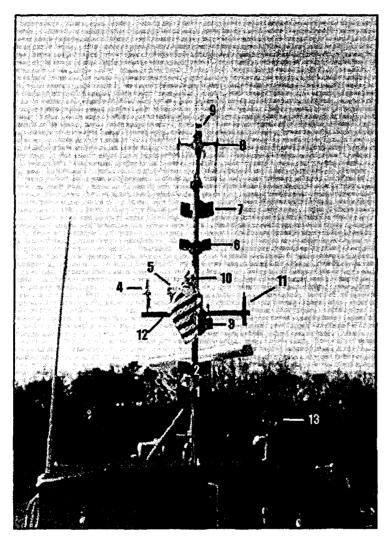
The M-60 mounting bracket is centered in the main deck handrail (the second stanchion) both port and starboard side at Frame 9.

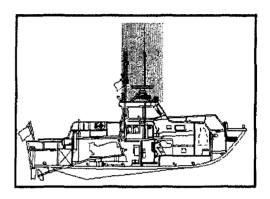
## F.11. Main engine air intake vents

These vent ducts are outboard of the main deck handrails between Frame 9 and Bulkhead 10. They provide fresh air to the engine room.



### Section G. Mast





- 1. Stern Light
- 2. 2nd Towing Light
- 3. 2nd Mast Head Light
- 4. GPS Antenna
- 5. DGPS Antenna
- 6. Towing Light
- 7. Mast Head Light
- 8. VHF-FM ADF Antenna
- 9. Anchor Light
- 10. CG Ensign
- 11. VHF-FM Radio Antenna
- 12. Mast Cross Arm
- 13. Aft Floodlight

Figure 2-22
Mast
(Looking forward from the Main Deck)

G.1. General

The 17' mast is on the centerline just aft of the pilothouse bulkhead (at Frame 7) and is hinged to fold down aft. Wires for electrical and electronic systems go up through the mast and exit at the appropriate level. The mast has a junction box 12" from the bottom, a drain hole at the bottom, and a ground strap (welded or bolted to the mast and bolted to the cabin).

NOTE &

All wires must exit the mast to the pilothouse through the junction box. All splices or connections for these wires must be inside the junction box. Where wires exit the mast at light or antenna levels, grommets must be used to prevent chafing.



### G.2. Mast lights The installed configuration is:

Light	Location
Anchor (white)	Top center of the mast, 15' above the mast bottom plate.
Masthead (white)	Forward side of mast, 12'11" above the mast bottom plate.
2nd Masthead (white)	Forward side of the mast, 9'7" above the mast bottom plate.
Stern (white)	Aft side of the mast, 7'7" above the mast bottom plate.
Towing (yellow)	Aft side of the mast, 11' 7 ½" above the mast bottom plate.
2nd Towing (yellow)	Aft side of the mast, 8' 8 ¾" above the mast bottom plate.

### G.3. RDF antenna

The four sector radio direction finder (RDF) antenna is mounted just below the anchor light a top the mast. Due to the four antenna prong's additional height above the light, the resulting fixed mast height is 17'.

### G.4. Crossarm antennas

There is a 36" long aluminum crossarm installed on the forward side of the mast just above the second masthead light. The following is a list of the antennas mounted to this crossarm:

Antenna	Location
Global Positioning Antenna	On the port side of the crossarm.
Differential Global Positioning Antenna	Inboard of the Global Positioning Antenna, on the port side.
VHF-FM Antenna	On the starboard side end on top of the crossarm.
VHF-FM Guard Antenna	On the starboard side end, underneath the crossarm, below the VHF-FM antenna. (Not pictured)



#### Section H. Engine Room

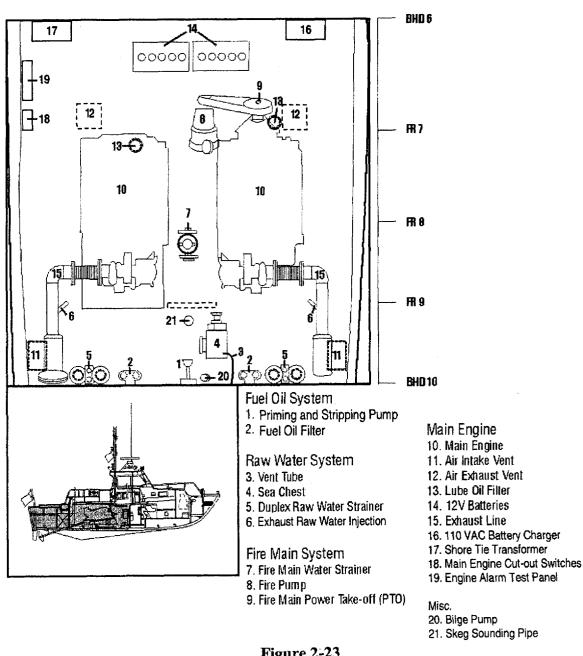


Figure 2-23
Engine Room

H.1. General The engine ro

The engine room extends from Bulkhead 6 to Bulkhead 10, below the main deck.



### H.2. Engine room ladder

This ladder is directly beneath the engine room scuttle for access to the engine room.

# H.3. Electrical system

This system provides all electrical power utilized by the boat in port and underway.

Item	Location
12V Batteries	The two batteries are just off centerline port and starboard, just aft of Bulkhead 6. They are wired in series to produce 24V DC.
Battery Charger	This is mounted to Bulkhead 6, at the extreme starboard side of the engine room.
Shore-Tie Transformer	This is on the aft side of Bulkhead 6, at the extreme port side.
Main Engine Cut-out Switches	On the port side hull, just forward of Frame 7. These two switches prevent accidental main engine starting during maintenance.
Engine Alarm Test Panel	On the port side hull, just forward of the engine cut-out switches. This panel has alarm system test switches (engine jacket water temperature and lube oil pressure) for each engine.
120V AC Receptacle	On the port side hull between Frames 7 and 8.
Compartment Lighting	There are four 24VDC white lights on the overhead: one forward and one aft on centerline and one outboard of each engine.

## H.4. Raw water system

This system provides cooling water for operation of the main engines, as well as water for the firefighting system.

Item	Location	
Vent Tube	Used to vent the sea chest of air. The hose runs from the top of the sea chest and penetrates through Bulkhead 10 into the well deck, between the drop pump and tow reel.	
Sea Chest	Starboard of centerline, between Frame 9 and Bulkhead 10, just aft of the Engine Room ladder. It serves both main engines and the firemain and vents to the well deck.	



Item	Location	
Duplex Raw Water Strainers	Just forward of Bulkhead 10 at Longitudinals 4 and 5 port and starboard sides.	
Exhaust Raw Water Injection	Each main engine routes heated raw water from the system into the exhaust line at Frame 9.	

## H.5. Fire main system

This system provides water to a fire riser on the main deck for distribution to firefighting and dewatering equipment.

Item	Location
Fire Main Strainer	On the centerline just forward of Frame 9 (underneath the access plate and just below the ladder), this strainer is supplied by a 3" IPS line to accommodate the firemain pump capacity.
Fire Pump	Inboard of the starboard main engine at Frame 7.
Fire Main Power Take- Off (PTO)	On the forward end of the starboard main engine. It produces the power to drive the fire pump. A safety catch keeps the PTO handle disengaged when the pump is not operating.

#### WARNING 💖

Do not engage or operate the PTO over 1,000 RPM.

## H.6. Main engines

The main engines are the propulsion source for the 41' UTB. The starboard engine also operates the fire pump.

Item	Location
Cummins Diesel Engines (VT-903M)	Port and starboard between Frames 7 and 9. The engines are turbocharged Cummins diesels.
Air Intake Vent	Just forward of fuel tank vents, outboard of port and starboard side liferails, aft of Frame 9. They extend into the engine room to a level below the main engine turbochargers.
Air Exhaust Vent	On the aft pilothouse outboard of door (port) and raft (starboard) at Frame 7. At main deck level the ductwork is a part of the aft pilothouse bulkhead, port and starboard side.
Lube Oil Filters	These filters are at the forward starboard end of each main engine.



Item	Location	
Fuel Oil Filters	On Bulkhead 10, port and starboard of the centerline.	
Exhaust Lines	Beginning on the aft outboard side of each main engine, the exhaust lines pass through Bulkhead 10 outboard of longitudinal 5.	

# H.7. Bilge pump

This pump is starboard of centerline just forward to Bulkhead 10. It discharges overboard through a hose to the starboard side through a check valve.

NOTE &

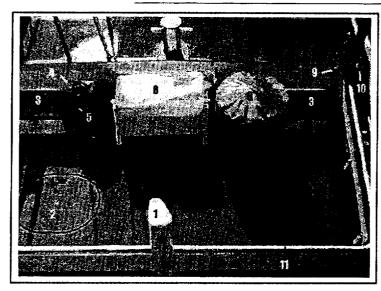
All crew members should remain aware that Federal laws prohibit the dumping oil pollution and hazardous material discharge in all navigable waters of the United States

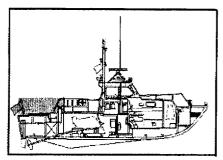
# H.8. Skeg sounding pipe

This is a ¾" diameter, 10" long, schedule 40 aluminum pipe with screw cap. It is welded into the hollow, airtight skeg. It is located just aft of Frame 9, and just starboard of the centerline.



#### Section I. Well Deck





- 1. Flagstaff
- 2. Lazarette Scuttle
- 3. Deck Storage Boxes
- 4. Fuel Oil Fill/Sounding Tubes
- 5. 5-Gallon Gas Can (w/cover)
- 6. Towline and Stowage Reel (w/cover)
- 7. Sea Chest Vent
- 8. Dewatering Pump (w/cover)
- 9. Engine Room Hatch Tension Bar Access
- 10. Fuel Tank Vent
- 11. Taff Rail

Figure 2-24 Well Deck

#### I.1. General

The well deck is the recessed area of the weather deck between the main deck and the transom.

#### I.2. Flagstaff

A 6'6" Flagstaff is fitted in a socket on the centerline, just aft of the taff rail in the transom deck. A #11 Nation Ensign is hung from it while in port and underway.

### I.3. Lazarette scuttle

Access to the lazarette is through a 19" x 26", flush-mounted, watertight scuttle. The scuttle can be opened using the hand lever from the inside or a T-wrench from the outside.



### I.4. Deck storage boxes

The boxes are located outboard, port and starboard sides. They double as access steps into the well deck area. The lids for these boxes are held closed by rubber straps. The bottom of these boxes should have an aluminum grating to keep stowed items off the deck. Within these boxes are items per Appendix A.

## I.5. Fuel oil fill/sounding tubes

Fill/sounding tubes are on the inboard side of the deck boxes aft of Bulkhead 10 both port and starboard sides.

## I.6. 5-Gallon gas can

The can is located inboard of the port deck box. The optional cover if used, shall be red in color.

## I.7. Towline and storage reel

The reel is on the centerline just aft of Bulkhead 10. The reel holds 600' of 2 34" DBN line. The required fitted cover is made of naugahyde and is white in color. The cover keeps the sunlight from causing damage to the line when not in use.

### I.8. Sea chest vent

The vent exits Bulkhead 10 just below main deck level to starboard of the tow reel.

### I.9. Dewatering pump

This pump, enclosed in a watertight canister, is secured in a special bracket on the starboard side inboard of the deck stowage box. The optional cover if used, shall be orange in color.

# I.10. Engine room hatch tension bar access

Access to adjust, remove, or install the torsion bar is through a plate located in Bulkhead 10, above and outboard of each deck storage box.

### I.11. Fuel tank vents

These vents are just aft of Bulkhead 10, port and starboard gunwales. They are fitted with 40-mesh flame screens.

#### I.12. Taff rail

A 1-1/4" polished schedule 40 pipe that follows the contour of the well deck. Used to fairlead towline over the side.

### I.13. Fuel tank sounding rods

These flat measuring rods (not pictured) are in brackets welded to Frames 11 and 12, under the gunwales port and starboard side. The measuring side of the rod shall be unpainted, and the reverse side shall be painted flat black. (See Figure 3-2 for measuring level marking points.)



I.14. Rudder arms	The rudder arms are under the transom deck between Frames 12 and Bulkhead 13 and Longitudinals 2 and 3, port and starboard sides. (See Figure 3-9)	
I.15. Hydraulic ram	(See Section 3.B.3. and Figure 3-9)	
I.16. Tie rod bar	This adjustable rod is under the transom deck and connects the two rudd arms. (Also see Section 3.B.4. and Figure 3-9.)	
I.17. Cleats	(See Section 2.K.1.)	

#### Chapter 2 – Boat Characteristics





#### Section J. Lazarette

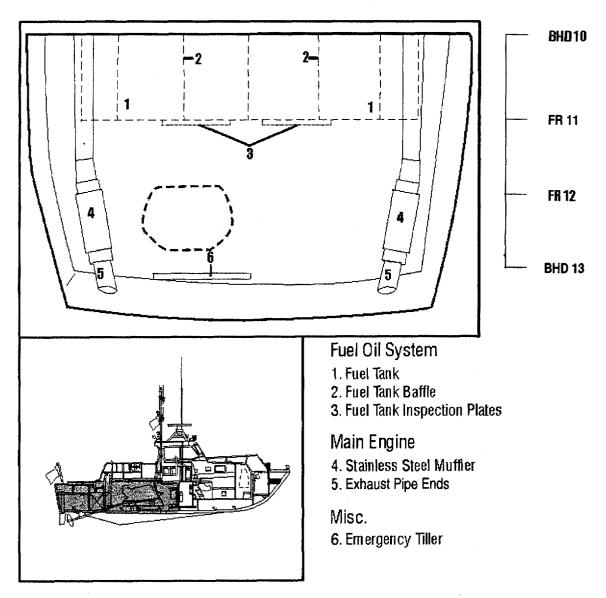


Figure 2-25 Lazarette

#### J.1. General

The lazarette is the fourth watertight compartment of the boat that extends from Bulkhead 10 to the transom below the well deck.

### J.2. Emergency tiller

The emergency tiller is stored in the lazarette between Frame 12 and Bulkhead 13 in brackets mounted to the port side Longitudinals 2 and 5.



### J.3. Rudder tube

The rudder tubes are between Frames 12 and Bulkhead 13 both port and starboard sides at Longitudinals 2 and 3.

### J.4. Fuel oil system

This system provides fuel oil to the main diesel engines.

Item	Location
Fuel Tanks	Two fuel tanks with a common center bulkhead are between Bulkhead 10 and Frame 11. They run athwartship (not fully side to side), and are built into the hull.
Fuel Tank Baffles	Each tank has one removable baffle installed in a vertical position athwartship in the center of the tank.
Fuel Tank Inspection Plates	Two removable inspection plates allow access inside the tanks at Frame 11 just outboard of the keel port and starboard side. Access is from within the lazarette.

### J.5. Stainless steel mufflers

These connect with the exhaust pipes in the lazarette at Frame 12.

## J.6. Exhaust pipe ends

These pipes, the last piece of the exhaust lines, are welded into the transom with the stainless steel mufflers fitted over them.

# J.7. Shaft strut air test fittings

The air test fittings are between Frame 11 and 12 at Longitudinal 3, port and starboard. Each fitting has a ½" coupler and ½" flush stainless steel allan head-type plug for air testing.



#### Section K. Mooring Equipment and Fittings

K.1. Cleats

The boat has eight 15" stainless-steel deck cleats, paired port and starboard. They are at Bulkhead 2, Frame 5, 14" aft of Frame 8, and at Frame 11. The cleats are bolted through the deck, have locknuts and stainless steel flat washers securing them, and are designed to withstand the force of boats towed alongside.

NOTE &

Cleats should be inspected regularly and replaced if cracked or deformed. Either hollow or solid cleats are authorized. If it becomes necessary to replace a cleat, it must be replaced with a solid cleat.

K.2. Fenders

Fenders are stowed in the passenger compartment stowage area.

K.3. Lines

Four mooring lines, two 30' lengths and two 60' lengths of 2 ¾" DBN, are required. They are stowed in the passenger compartment stowage area. Units are authorized up to 150' of additional line, stowed in the storage area, as the operating area dictates.

#### Chapter 2 - Boat Characteristics





# **Chapter 3 Boat Systems and Components**

#### **Overview**

#### Introduction

This chapter discusses the 41' UTB's mechanical, electronic, and manual operating systems. It describes basic operating characteristics and provides information for efficient use of the equipment and for prevention of casualties.

#### In this chapter

This chapter contains the following sections:

Section	Title	See Page
Α	Propulsion System	3-3
В	Steering System	3-21
С	Fire Main System	3-23
D	Firefighting Equipment	3-25
E	Dewatering Equipment	3-27
F	Fire Extinguishing Agents	3-31
G	Electrical System	3-35





#### Section A. Propulsion System

#### **Overview**

#### Introduction

This propulsion system provides the ability for the 41' UTB to accomplish all its missions. For each of these systems, addition information is provided in the manufacturers technical publications.

#### In this section

This section contains the following information:

Topic	See Page
Engines	3-4
Lubrication Oil System	3-5
Fuel Oil System	3-7
Main Propulsion Cooling Systems	3-11
Engine Exhaust System	3-15
Engine Alarm System	3-17
Main Propulsion System	3-18



#### **Engines**

#### A.1. General

The main engines on the 41' UTB are twin VT-903M Cummins marine diesel engines. Except for the front-end modifications (starboard engine only) required to install the firemain power take-off, all engines of the same number are interchangeable and have the same fuel consumption and speed figures. The specifications are:

- 340 shaft horsepower
- four-stroke
- eight-cylinder
- liquid-cooled
- right-hand rotation from the front
- Model VT-903M which represents:

V - block configuration

T - turbo charged

903 - cubic-inch displacement

M - marine version



#### **Lubrication Oil System**

#### A.2. General

The Cummins lube oil system (See figure 3-1) is a full-flow, high-pressure lubricating system. Oil capacity is 5 gallons in the sump and approximately 1 additional gallon in the lines and filter. This system is comprised of a pump, cooler, and filter. The lube oil type used is 15W40.

#### **CAUTION!**

Use care in adding lube oil to this engine. The interval marks on the dipstick between "low" and "high" represent two quarts. If overfilled, the engine seals may be damaged.

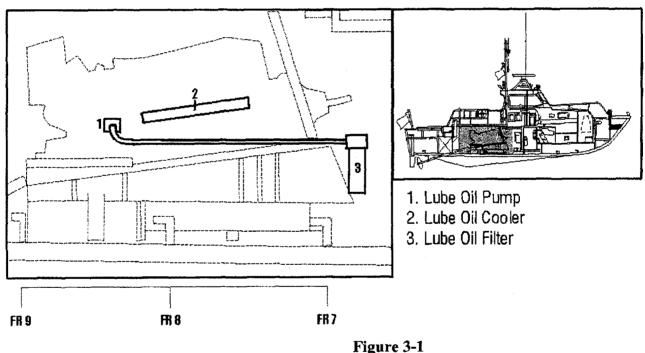


Figure 3-1 Lube Oil System

## A.3. Lube oil pump

This internal engine, gear-type, pressure-regulated pump produces lube oil systems operating pressures of 10 - 30 psi at idle and 45 - 65 psi at cruising speed (30 psi minimum).

### A.4. Lube oil cooler

Lubricant oil circulating through the engine passes through this externally mounted device and is indirectly jacket water cooled before continuing circulation.



### A.5. Lube oil filter

This externally mounted spin-on type filter receives lubricating oil from the lube oil cooler. This filter removes microscopic particles from the lubricating oil to reduce engine wear. A bypass check valve in the filter head allows continuous flow if the filter becomes clogged.



#### **Fuel Oil System**

#### A.6. Fuel tank

Fuel oil is carried in two, 243.4 gallon tanks with a common center bulkhead. The tanks are built along the contour lines of the hull between Bulkhead 10 and the aft bulkhead of the fuel tank at Frame 11. Each tank tapers inboard from Longitudinal 5 on the bottom shell plate to Longitudinal 4 at main deck level to allow sufficient room for the main engine exhaust lines to pass outboard of the tank. The tanks are accessed within the lazarette through the inspection plates in Frame 11 for inspecting and cleaning. A removable baffle reduces free surface effect within each tank. (Also see Section 2.J.4.)

#### A.7. Fuel fill/ sounding pipe

A fuel fill/sounding pipe is installed in each tank inboard of the deck storage boxes in the well deck area. It extends through the well deck ending 2" from the bottom of each tank. A striker plate installed directly under each sounding pipe prevents wear on the bottom shell plating when sounding the tank. A calibrated, aluminum, flat bar sounding rod is stowed in brackets welded to Frames 11 and 12 on the port and starboard sides of the well deck (See Section 2.I.13.). The fuel sounding bar shall have markings at the following fuel levels:

. Volume (gal.)
50
75
100
125
150
175
200
225
95% (231.5)
100% (243.4)

Figure 3-2
Fuel Tank Sounding Table



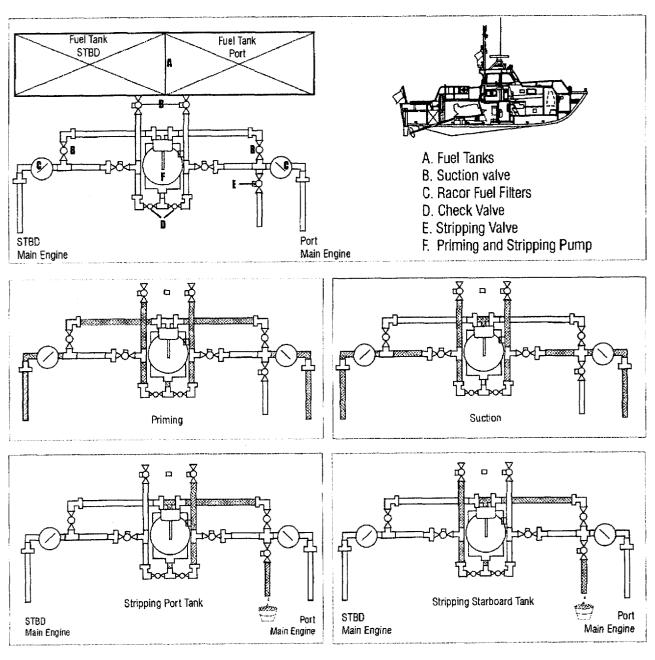


Figure 3-3
Fuel Oil Supply System



#### A.8. Fuel vent

#### (See Section 2.I.11.)

NOTE &

Fill fuel tanks to 95% capacity (231.5 gallons) upon completion of each sortie. This will:

- minimize condensation in the fuel tank preventing water contamination of the fuel.
- allow a void for natural expansion of vapors as the fuel heats.
- contribute to operational readiness.

### A.9. Suction ports

Each tank has a single source of suction from which to draw fuel oil. This suction port is used for priming the system and day-to-day operations. This suction port is also used for stripping contaminated fuel from the tanks.

### A.10. Stripping lines

Stripping lines with ball valves are installed to remove water or sediment from the bottom of the tank as necessary.

# A.11. Priming and stripping pump

A dual-purpose, hand-operated pump is in the supply side of the fuel system. The pump removes contaminated fuel from the bottom of either tank. It also provides fuel to prime the fuel supply system as necessary. The pump transfer capacity is rated at 20 gallons per 100 strokes.

### A.12. Fuel oil filter

This filter/water separator-type Racor filter installed in each engine fuel line removes finer contaminants and trace amounts of water from the fuel. The filters are on Bulkhead 10 outboard of the centerline.

### A.13. Fuel supply line

The fuel supply lines have manually activated ball valves, a priming and stripping valve, and directional flow check valves. These provide fuel passage and control from each tank through the various components.

# A.14. Main engine fuel pump

For each main engine, a fuel pump draws fuel from the respective fuel tank through the line, strainer, and filter and then delivers it to the fuel injectors under pressure. Excess fuel not used for combustion is circulated through the injectors to cool and lubricate.

### A.15. Fuel oil return line

The fuel return lines at the front of each cylinder head merge into one return line for each engine. These fuel lines carry excess fuel from each engine to standpipes in the outboard corners of Bulkhead 10. Fuel flows from the standpipe back to each fuel tank.



### A.16. Fuel oil check valve

A check valve in the fuel return is at the forward, starboard side of each engine. It prevents fuel backflow to the injectors while the engine is secured. It also maintains a positive prime on the system.

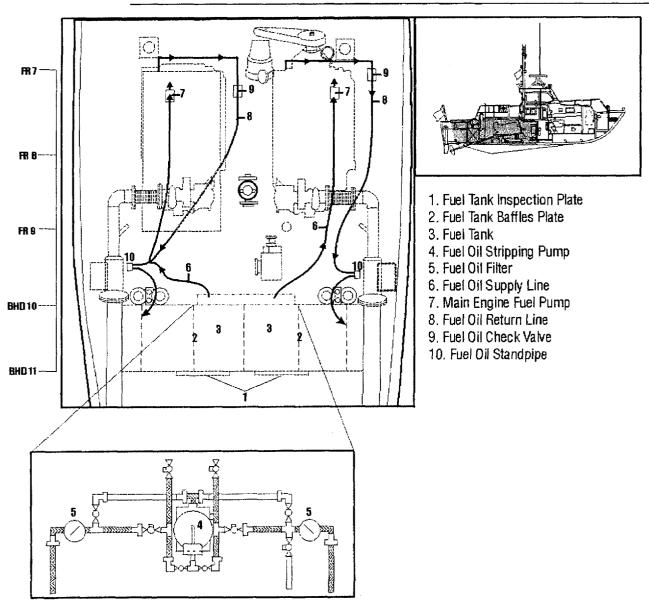


Figure 3-4
Fuel Oil System



#### **Main Propulsion Cooling Systems**

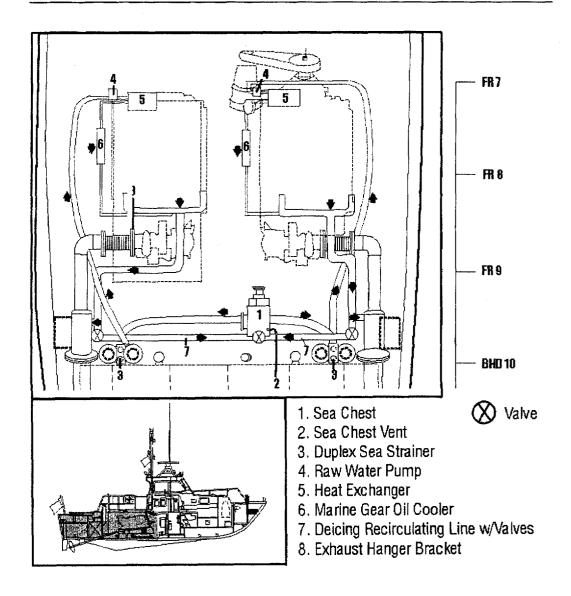


Figure 3-5 Raw Water System

#### A.17. General

To maintain efficient operating temperatures in the main engine and reduction gear, the boat uses a dual raw cooling/jacket water cooling and heating system. The raw water cools the closed-circuit jacket water system in the engine heat exchanger, located on the top, forward-most portion of each engine.



### A.18. Raw water system

Raw water passes through a tube bundle, located within the heat exchanger. As jacket water passes over these tubes, heat is transferred from the engine's jacket water to the raw water and is carried away. In addition to removing heat from the main engines, the raw water also passes through the marine gear oil coolers and assists in cooling the engine exhaust gases. (See Figure 3-5.)

### A.18.a. Sea chest

The sea chest is a rectangular, fiberglass box bolted internally to the hull shell plating in the engine room. It provides water to the main engine and firemain systems. A perforated cover plate bolted externally over the sea chest opening reduces air turbulence and prevents debris from entering the sea chest.

Item	Location
Sea chest vent	The sea chest vent line on top of the sea chest, allows trapped air to be vented into the atmosphere. The vent line goes aft, through a ball-check valve, and up Bulkhead 10. The line exits Bulkhead 10 in the well deck to starboard of centerline.
De-icing recirculating line	The de-icing recirculating line is a branch line off the main engine exhaust raw water injection fitting. It has a valve for regulating flow. This line carries heated raw water to the sea chest for de-icing during cold water operations. Heated raw water routed to the sea chest must be controlled to prevent main engine overheating or high muffler/exhaust pipe temperatures.

A.18.b. Duplex sea strainer

A 2 ½" duplex sea strainer is installed in the raw water supply line between the sea chest and the main engine raw water pump. The dual basket design has a switching handle. This switching handle allows cleaning of both strainer baskets without interrupting the water flow to the raw water pump.

#### **CAUTION!**

Disruption of raw water flow for more than 3 minutes will damage the raw water pump impeller.



## A.18.c. Raw water pump

Each engine is indirectly cooled by a gear-driven, impeller-type pump. Pump output is governed by engine operating speed (RPM). The pump is on the forward, port side of each engine. It delivers up to 60 gallons of raw water per minute through the heat exchanger and reduction drive oil cooler, depending on engine speeds (RPM).

# A.18.d. Marine gear oil cooler

Raw water from the heat exchanger passes through the oil cooler. This raw water is then routed into the recirculating line for injection into the exhaust combustion chamber.

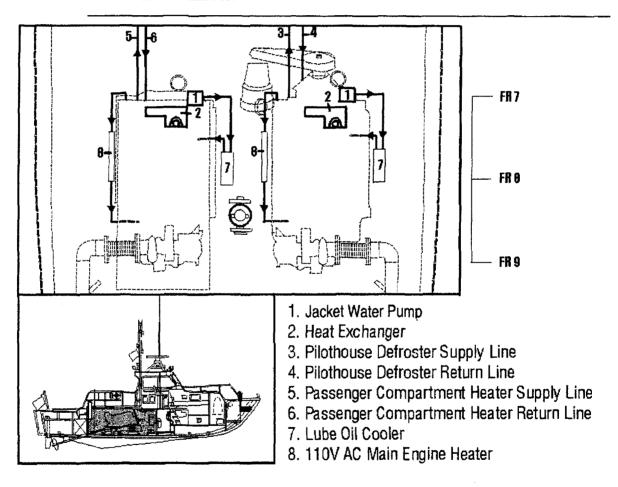


Figure 3-6
Jacket Water Cooling and Heating System



### A.19. Jacket water system

This is a closed, internal main engine circulating system that has a 12-gallon capacity (See figure 3-6). In addition to cooling the main engine, it provides heated coolant to the pilothouse windshield defroster units and the passenger compartment underway heater. The coolant is a mixture of glycol antifreeze and fresh water, proportioned in accordance with manufacturer's instructions. In addition, an installed canister releases a timed amount of corrosive inhibitor into the coolant system.

#### NOTE &

The antifreeze used in the jacket water system must be compatible with DCA. **Do not** use Downtherm 209 antifreeze.

### A.19.b. Heat exchanger

In the exchanger, the hot jacket water coolant has heat removed by cool raw water passing through a tube bundle immersed in the hotter, jacket water engine coolant. Thus, the raw water transfers the heat from the jacket water coolant without contaminating the jacket water system.

#### A.19.c. Pilothouse defroster

Heated coolant in the jacket water system passing from the starboard main engine provides heat for the pilothouse defroster.

#### A.19.d. Passenger compartment heater

Heated coolant in the jacket water system passing from the port main engine provides heat for this heater. (Also see Section 2.D.13.)

### A.19.e. Lube oil cooler

This externally mounted cooler has separate passages for jacket water system coolant and main engine lube oil. The jacket water system coolant carries heat from the lube oil, through the system and back to the heat exchanger.

#### A.19.f. 110V AC main engine heater

This externally mounted, main engine block/coolant heater is integrated into the jacket water coolant system on each engine. The heater maintains the engine coolant temperature between 100 and 120 when the main engines are not operating and shore power is supplied.



#### **Engine Exhaust System**

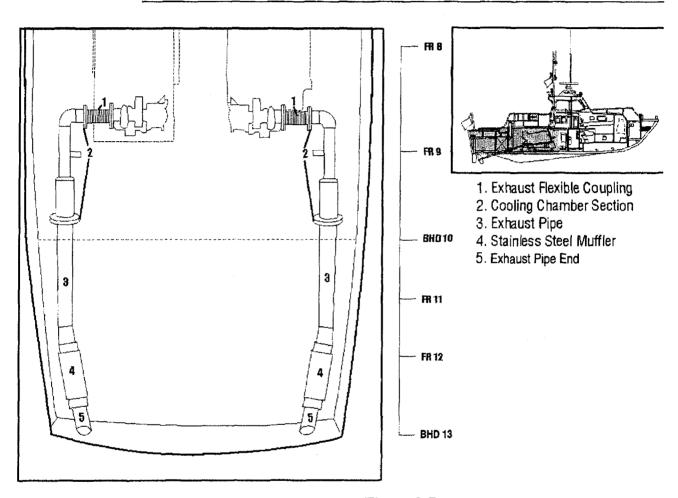


Figure 3-7
Main Engine Exhaust System

#### A.20. Functions

The exhaust system serves the following functions:

- discharges toxic main-engine exhaust gases;
- discharges quantities of heated raw water from the raw water system; and
- reduces the crew's exposure to the exhaust gases.

### A.21. Exhaust manifold

Exhaust manifolds are bolted to each main engine cylinder head. The jacket water system circulates coolant through internal passages in the exhaust manifolds. This cools the manifolds and indirectly cools the exhaust gases.



### A.22. Exhaust riser

The exhaust riser connects both engine exhaust manifolds. It balances and directs the exhaust gas, which drives the turbocharger. Raw water system coolant leaving the main engine heat exchanger and the marine reduction gear oil cooler passes through tubing inside the exhaust riser. This raw water coolant piping indirectly cools the exhaust gases before they enter the turbocharger.

### A.23. Exhaust pipe

The exhaust pipe runs from the turbocharger to the transom. It is a combination of 5" and 6" stainless steel and 6" aluminum exhaust piping.

A.23.a. Exhaust flexible coupling

This flexible 5" IPS stainless steel section of exhaust piping runs between the main engine turbocharger exhaust port and the exhaust pipe. It helps reduce the transfer of main engine vibration to the solid exhaust pipe. In also acts as the exhaust system expansion joint by isolating the expansion and contraction of the system due to heating and cooling.

#### **CAUTION!**

The raw water exhaust/recirculation line support bracket MUST be installed at the exhaust flexible coupling. Frequent checks of the bracket fasteners are necessary to ensure tightness. The bracket should also be periodically checked for cracks caused by vibration. NEVER step on the bracket.

### A.23.b. Cooling chamber section

This stainless steel section joins the 5" IPS flexible coupling section and the 6" IPS aluminum exhaust pipe. The exhaust cooling chamber is the double-walled portion, approximately 2'long, created by the overlap of 5" and 6" IPS pipe. The outboard end of the 5" IPS exhaust pipe is not welded shut. The raw water coolant line from the exhaust riser enters the exhaust pipe through the 6" IPS expansion chamber. The raw water coolant, is injected into the exhaust pipe reducing exhaust gas temperature and overall exhaust noise.

### A.23.c. Exhaust pipe

This 6" IPS aluminum exhaust pipe runs aft and parallel to the shell plating. It starts just forward of Bulkhead 10, passes through the bulkhead outboard of the fuel tank, and ends just aft of Frame 11.

### A.23.d. Stainless steel muffler

This stainless steel muffler is in the exhaust pipe at Frame 12. Mufflers are resistant to salt, oils, and acids.

### A.23.e. Exhaust pipe ends

This short section of 6" IPS aluminum exhaust pipe is welded into the transom. This last section in the exhaust pipe connects the stainless steel muffler and the transom.



#### **Engine Alarm System**

### A.24. Alarm system

Each main engine has its own 24V DC independently operating alarm system. The alarms alert the crew when engine standards drop below or rise above normal operating ranges. The system consists of the following:

- jacket water coolant temperature alarm and light
- lube oil alarm and light
- alternator fault light

#### A.25. Alarm bell

During normal operating conditions, the water temperature switch is open and the lube oil pressure switch is closed. An abnormal rise in water temperature will close the water temperature switch. A drop in lube oil pressure will open the lube oil pressure switch. In either case, the alarm bell, located under the steering console, will sound. The system has a silencing switch for the alarm bell when securing or performing maintenance on the engine.

#### NOTE &

There are two freshwater, high-temperature switches in use in the field. One is set at 200°F (plus or minus 5°F) and one is set at 205°F (plus or minus 5°F). There are also two lube-oil, low-pressure switches in use in the field. One is set at 18 psi and one is set at 12 psi.

#### A.26. Mechanical gauges

These gauges are in the steering console and are not connected to nor affected by the alarm systems. (See Section 2.E.43. for a detailed listing and description of each gauge.)



#### **Main Propulsion System**

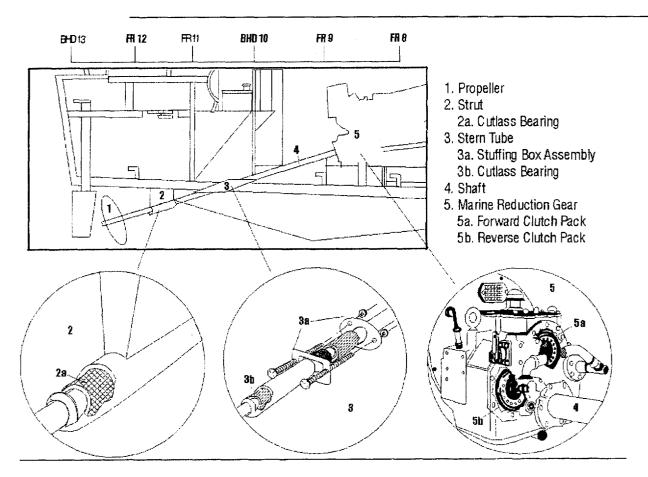


Figure 3-8
Marine Propulsion System

## A.27. Marine gear

The Twin Disc MG-509 marine gear transfers power from the main engines to the shafts. The marine gear gives a straight engine to shaft/propeller speed reduction of 2:1 ratio, in either forward or reverse. This reduction in shaft/propeller to one-half that of the main engine provides optimum power for high speed and excellent maneuverability characteristics.

Operation of the marine gear is completely hydraulic. The bearings are oil lubricated. Both forward and reverse clutch packs are engaged by high-pressure oil and cooled and lubricated by low-pressure oil. Oil capacity is 10 quarts in the marine gear and 1 additional quart in the marine gear oil cooler.

The following unique features enhance the overall operation and capability of the boat:



# A.27.a. Twin clutch pack feature

Each marine gear has two clutch packs. One provides forward motion and the other provides reverse motion. This twin clutch pack feature creates a more versatile operational setup.

#### A.27.b. Mechanical emergency "come-home" feature

If the starboard forward motion clutch pack fails, a mechanical lockup device in the marine gear allows the use of the disabled gear in the **forward motion** function **only**. (See Section 7.B.15, Reduction Gear Failure, for use of this feature.)

#### NOTE &

The emergency "come-home" feature can only be used on the starboard marine gear. See "Morse Control Hook-Up" below for further explanation.

#### WARNING 💖

The starboard main engine must be secured before engaging the emergency "comehome" feature. Failure to secure the starboard engine will result in personnel injury.

## A.28. Morse control hookup

A single, two-lever Morse Control unit installed on the steering console controls both main engine throttles and marine gear. This Morse Control unit allows individual (port or starboard) engine throttle and marine gear control by a single lever.

To improve the 41' UTB's handling characteristics, the port Morse Control cable hookup at the marine gear control mechanism has been reversed. This reverse hookup uses the reverse clutch pack to achieve forward motion and the forward clutch pack to achieve reverse motion. This produces an opposing movement on each shaft/propeller.

#### A.29. Propellers

The boat has two 26" diameter, 28 pitch, nickel-aluminum-bronze alloy, American Bureau of Shipping (ABS), grade 4, four-blade propellers. The starboard propeller is a right-hand rotation while the port is a left-hand rotation.

#### A.30. Strut

Each shaft is supported by a single leg strut located just forwarded of Frame 12.



#### A.31. Shaft

Power from the main engine/marine gear is transmitted by way of the 2" diameter propeller shaft. The shaft is made of Armco Aquamet 17 corrosion-resistant steel. The shaft penetrates the hull shell plate at Bulkhead 10 through the stern tube that is welded to a reinforced section of the hull.

In the forward motion position, the shafts rotate outward from the top. The counter-rotating shafts reduce propeller side thrust and overcome the natural tendency of the stern to walk sideways when shaft/propellers are engaged. If the port and starboard main engine RPMs are not matched when in forward motion, the stern will walk in the direction of the faster turning propeller and when in reverse motion, away from that direction.

### A.32. Stern tube

The stern tube is a round, aluminum tube. It has a cutlass bearing inserted in the outer end to support the propeller shaft where it penetrates the hull. The tube also has a stuffing box in the inner end to prevent water from entering the hull.

### A.33. Stuffing box

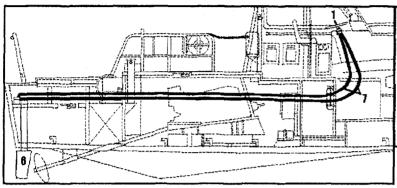
The stuffing box attaches to the stern tube by a short section of cloth-impregnated rubber hose. This adjustable box is in the engine room. It contains packing material to control raw water entry into the hull around the shaft. Raw water leakage (adjusted to approximately 6 - 10 drops per minute) reduces shaft/packing friction and aids in cooling the shaft and shaft packing.

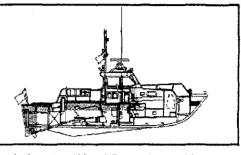
# A.34. Cutlass bearing

Each propeller shaft is supported in the strut and stern tube by a Cutlass bearing through which the shaft is fitted. The bearing is made of fibrous material impregnated with phenolic resin. These bearings help reduce friction and wear on the propeller shaft.



#### Section B. Steering System





- 1. Steering Wheel/Pump Assembly
- 2. Push Pins
- 3. Tie-rod Bar
- 4. Rudder Arm
- 5. Rudder Post
- 6. Rudder
- 7. Hydraulic Flexible Hoses
- 8. Hydraulic Ram

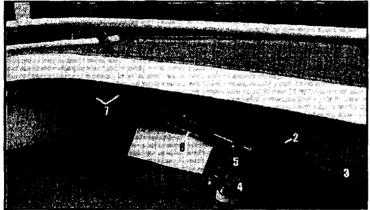


Figure 3-9
Steering System

### B.1. Steering wheel

The steering wheel is a 20", non-magnetic, stainless steel Morse wheel. It is located on the steering console in the pilothouse. (Also see Section 2.E.42. and Figure 2-13.)

# B.2. Hydraulic helm assembly

This hydraulic device connects the steering wheel to the hydraulic ram via two hoses. It is located within the steering console, and accessed through the console access panel (See Figure 2-7).

### B.3. Hydraulic ram

The ram is connected to the starboard rudder arm with a removable pushpin.



#### B.4. Tie rod bar

The bar is a 1" diameter, Monel tie-rod bar with a bronze, threaded (adjustable), pin-type clevis fitting on each end. Removable pushpins, inserted in the clevis fittings, connect the tie-rod bar and rudder arms allowing the rudders to act in unison. The threaded, pin-type, clevis fitting allows for easy adjustment of the rudders and/or removal of the tie rod from the rudder arms.

#### **B.5.** Rudders

#### **CAUTION!**

During casualty steering, **Do not** allow personnel to hand tend the emergency tiller if it becomes necessary to back down. The rudders are aft of Frame 12, between Longitudinal 2 and 3. The rudderpost is made of Armco Aquamet 17 corrosion-resistant steel. The rudder blade is made of 316 stainless steel. The rudders are held in place by bronze rudder arms (See Section 2.I.14.), drilled to accept the ram and clevis fittings on each end of the tie-rod bar. Rudder stops are welded to the deck on the inboard and outboard sides of the port rudder arm. The starboard rudder does not have rudder stops. Unless the starboard rudder is jammed, the tie rod is left in place during emergency steering. This prevents the starboard rudder blade from turning into the starboard propeller.



### Section C. Fire Main System

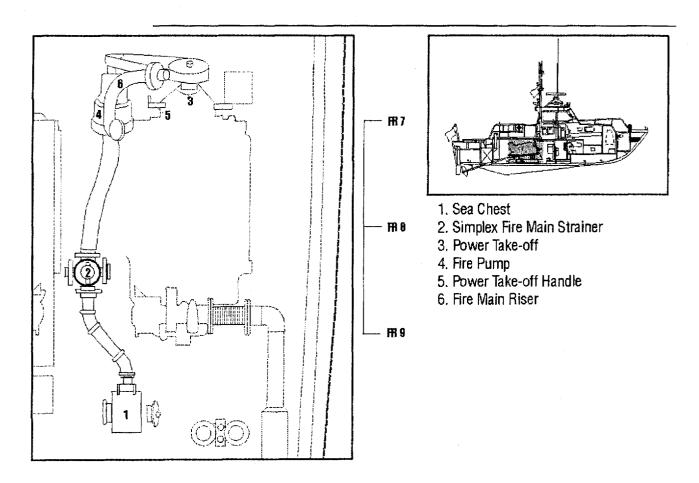


Figure 3-10 Fire Main

#### C.1. Sea chest

The sea chest provides raw water for the firemain system.

# C.2. Simplex/duplex firemain strainer

Installed between the sea chest and the fire pump is a simplex or duplex strainer. Raw water passes through this strainer before entering the fire pump.



### C.3. Power take-off

This mechanical device, when engaged, transfers power from the main engine to the fire pump. A 3" cleated rubber drive belt connects the power take-off and fire pump. To engage the power take-off, perform the following procedure:

Step	Procedure
1	Put the starboard marine gear in the neutral position.
2	The starboard main engine must be at idle speed.
3	Remove the securing strap, and then firmly move the handle using open palm to the forward position.
4	To increase the pump output from the idle position, increase the starboard main engine Morse Control lever to a maximum of 1000 RPM.

#### C.4. Fire pump

The fire pump is a single-stage, centrifugal-type pump located at the front, inboard side of the starboard main engine (Frame 7). The pump is rated to deliver 250 gallons per minute at 100 psi (produced by 1000 main engine RPM).

## C.5. Fire main pressure gauge

This gauge, located on the aft bulkhead of the pilothouse (See Figure 2-18), connects to the firemain at the fire pump. It provides the coxswain with discharge pressure readings.

#### **CAUTION!**

With the power take-off engaged and the marine gear engaged for maneuvering, significant changes in pump/hose pressure will occur with every RPM change. This unannounced reduction in hose pressure could cause crew members manning the hose to lose control, thus causing personnel injury. The coxswain should always announce pressure changes to the crew before throttle changes.

### C.6. Fire main riser

The riser piping transfers water from the pump to the tri-gate. The riser is a 2 ½" male threaded pipe leading from the fire pump to the main deck. It exits the main deck to starboard of centerline directly beneath the rescue and survival raft. (Also see Figure 2-11 and Section 2.E.31.)

#### C.7. Tri-gate

The tri-gate offers triple hose hook-up capability from a single-source fire main supply line. The tri-gate has one 2 ½" female threaded inlet connecting it to the fire main riser. The tri-gate also has two 1 ½" and one 2 ½" male threaded discharge ports (with covers) for hose attachment. (Also see Figure 2-11 and Section 2.E.31.)



### Section D. Firefighting Equipment

#### D.1. Hoses

Four hoses for firefighting and dewatering are stowed in the passenger compartment stowage area. The authorized sizes are:

- 1 ½" X 25' firefighting hose
- 1 ½" X 50' firefighting hose
- 2 ½" X 12' firefighting, eductor discharge hose
- 2 ½" X 30' fire monitor connector hose

#### D.2. Varinozzle

One 1 ½", multi-purpose, variable-stream firefighting nozzle is stored in the passenger compartment stowage area. The nozzle has a bail-type on/off handle. The nozzle stream can be changed from a fog-spray to straight stream by twisting the rubber-coated tip through its full range.

### D.3. Fire monitor

The fire monitor is made of 2 ½" steel with Fusecote anticorrosive coating. For control, the monitor has locking knobs for vertical angle positioning and a black, polyvinyl-coated wheel for horizontal directional control. The fire monitor has a nominal capacity rating of 750 GPM, where the fire pump capacity is rated at 250 GPM at 100 psi (1000 RPM).

The fire monitor gives the ability to fight large dockside or shipboard fires when the boat must stand off from the blaze. This allows one person to direct and control the stream with minimal effort at a much greater distance than it is possible with a hose. (Also see Figure 2-4 and Section 2.C.7.)

#### NOTE &

With the fire main power take-off engaged, use of the starboard marine gear for maneuvering is limited to a maximum of 1000 RPM. When the fire main nozzle is in the straight stream mode and the fire main operating at full pressure, the bow will be pushed in the opposite direction from which the nozzle is pointed. The coxswain must be prepared for maneuvering difficulty.

### D.4. Fire monitor nozzle

This chrome-plated fog nozzle with control handles provides flexibility with gradual adjustment from full fog to straight stream.





### Section E. Dewatering Equipment

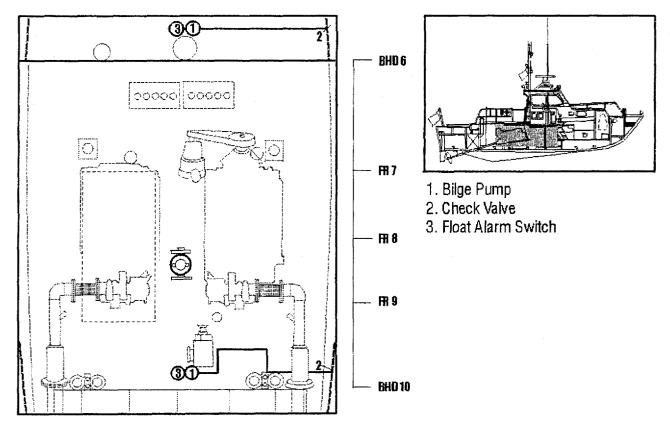


Figure 3-11 Bilge Pump System

### E.1. Bilge pump system

The boat has two 24V DC submersible-type bilge pumps. The pumps are starboard of the keel just forward of Bulkheads 6 and 10. Switches on the port side of the steering console activate these pumps. Pump capacity is rated at 1300 gallons per hour per pump. (Also see Section 2.D.27.)

### NOTE &

All crew members should remain aware that Federal laws prohibit the dumping oil pollution and hazardous material discharge in all navigable waters of the United States.

### E.1.a. Check valve

This is a one-way valve in the overboard discharge line. It prevents water from entering the hull if the overboard discharge outlet goes below the water level.



E.1.b. Overboard discharge The discharge lines run from the pump to outlets above the waterline and one inch below the top of the boot topping on the starboard side.

E.1.c. Float alarm switch

A float-type switch is installed at each bilge pump. When this switch floats upward, it activates the bilge alarm circuit, causing the boat's horn to sound and the blue light to energize.

#### E.2. Eductor

NOTE &

The portable aluminum eductor has an internal flapper valve. This prevents flooding the compartment being dewatered should the discharge hose

A portable aluminum eductor is stored in the passenger compartment stowage area. The eductor has a 1 ½ " inlet, a 2 ½" discharge fitting, and a detachable suction strainer.

Water pressure, supplied through a 1 ½" fire hose to the eductor, passes through a venturi tube nozzle creating a low-pressure (vacuum) chamber at the eductor. With the fire pump operation at 250 gallons per minute output to the educator, the vacuum created in the low pressure chamber will cause a discharge equal to double the input rate. Therefore, the resulting discharge rate is 500 gallons per minute. The maximum effective lift from the eductor level to discharge level is 20 feet.

## E.3. Dewatering pump kits

become kinked.

The CG-P1B is the standard Coast Guard pump. The CG-P5 is an authorized optional replacement. These pumps provide emergency dewatering for boats in danger of sinking. The CG-P1B has an output rate of 120 gallons per minute at a 5-foot suction lift. Under load it runs 4 to 5 hours per gallon of gasoline. The CG-P5 has an output rate of 200 gallons per minute at a 10-foot suction lift. Under load, this pump runs  $1\frac{1}{2}$  to  $2\frac{1}{2}$  hours per gallon of gasoline.

### E.3.a. CG-P1B configuration

The CG-P1B consists of a 3-horsepower, 4-cycle gasoline driven engine attached to a centrifugal pump. It is primed using the integral priming device directly atop the pump casing. The permanently attached 3" discharge hose has a discharge check valve at the hose end. This check valve prevents air from entering the pump during the priming step. The pump has a removable 1 ½" X 15' wire-wound suction hose with strainer. The CG-P1B uses a detachable polyethylene gasoline tank mounted on the side of the engine with a quick connect/disconnect fitting. Other features include corrosion-resistant parts, lightweight, and compact design. Special waterproof, bilingual operating instructions are provided with the pump. The pump is packed inside a round aluminum waterproof container.



### E.3.b. CG-P5 Configuration

The CG-P5 is a 5-horsepower, 4-cycle gasoline driven engine attached to a centrifugal pump and is configured the same as the CG-P1B with the following exceptions:

#### WARNING \*

When operating the CG-P1B or CG-P5 dewatering pumps, ensure sufficient ventilation. Carbon monoxide exhaust fumes are toxic to personnel.

- a recoil-type starter,
- a manually operated discharge check valve, and
- quick release hose fittings.

Special waterproof, bilingual operating instructions are provided with the pump. The pump is packed inside a round aluminum waterproof container.

### WARNING 💖

Use the CG-P1B or CG-P5 dewatering pumps for pumping fresh or sea water only. They may be used where small amounts of surface oil are present. Do not use if flammable (low-flashpoint) liquids are present (such as gasoline or paint thinner).

### E.3.c. Maintenance

The Coast Guard Rescue and Survival Systems Manual, COMDTINST M10470.10 (series), provides detailed instructions for:

- Pump acceptance inspection
- Monthly inspection and test run
- Quarterly inspection
- Packing the pump
- Post SAR inspection

### Chapter 3 - Boat Systems and Components





### Section F. Fire Extinguishing Agents

### **Overview**

#### Introduction

This section discusses the location and types of fire extinguishing agents aboard a 41' UTB.

#### In this section

Topic	See Page
Fixed Fire Extinguishing Systems	3-32
Portable Fire Extinguisher	3-34



### **Fixed Fire Extinguishing System**

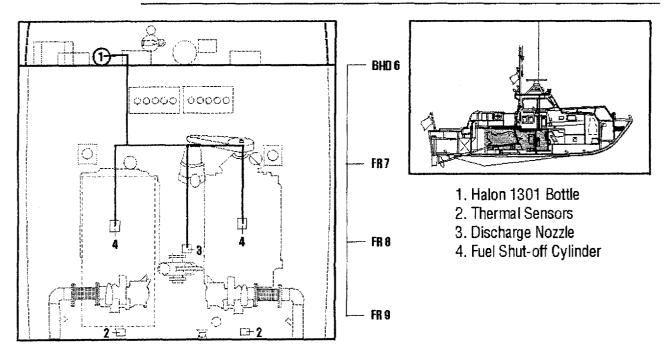


Figure 3-12
Fixed Fire Extinguishing Systems

#### F.1. Halon 1301

The 41' UTB is equipped with a fixed Halon 1301 fire extinguishing system to combat engine room fires. A thorough understanding of this system is vital.

### F.2. Halon bottle

The bottle containing Halon 1301 is mounted to Bulkhead 6, port of the engine room viewing window, in the passenger compartment stowage area. (Also see Figure 2-7 and Section 2.D.27.)

### F.3. Thermal sensors

There are two independently operating thermal sensors in the engine room, one aft of each main engine, mounted to the overhead. If the engine room temperature exceeds 190°F, the alarm horn will sound. The horn is mounted in the pilothouse steering console. An alarm horn test button is also on the steering console. (Also see Figure 2-13 and Section 2.E.42.)



### F.4. Discharge nozzles

The system has one discharge nozzle 9" off the centerline of the engine room, between the main engines. The fuel shut-off cylinders are located over each main engine.

#### WARNING 💖

Do not enter the compartment after a Halon discharge until ventilated.

#### NOTE &

The fixed Halon 1301 fire extinguishing system must be manually operated. If the alarm horn sounds, inspect the engine room through the viewing window at Bulkhead 6 to determine why the alarm is sounding before activating the system or entering the engine room.

### F.5. Fuel shut-off cylinder

The fuel shut-off cylinder is automatically engaged when the Halon system is activated in the case of an engine room fire. This prevents Halon dust from entering the main engine and causing unnecessary damage.



### **Portable Fire Extinguisher**

# F.6. Dry chemical (PKP) fire extinguisher

Potassium bicarbonate (PKP) is effective to varying degrees on all types of fires, but most effective on burning liquids (Class B). It is corrosive and will cause damage to electrical contacts and internal engine components. It will also clog engine parts. The 41' UTB has two 10-pound, dry chemical extinguishers. One is located in the passenger compartment on the pilothouse support stanchion (See Figure 2-7 and Section 2.D.27.), and the other is in the pilothouse just inboard of the door on the aft bulkhead (See Figure 2-18 and Section 2.E.55).

#### WARNING 💖

A dry chemical extinguisher does not cool or remove oxygen from the fire triangle. It is effective only in knocking down flames. If enough heat or an ignition source is present, the fire will reflash after the powder settles from the air. Class A fires are particularly prone to reflash. Dry chemical extinguishers are least effective on Class A fires.

### F.7. Carbon Dioxide (CO<sub>2</sub>) fire extinguisher

This extinguisher is most effective in fighting electrical (Class C) fires. CO<sub>2</sub> is especially suited for extinguishing fires in electrical panels and electronics as it does not conduct electricity and is non-corrosive. The 41' UTB carries one 5-pound CO<sub>2</sub> fire extinguisher is the passenger compartment on the aft bulkhead of the gun locker. Also see Figure 2-6 and Section 2.D.18.

#### WARNING 💖

CO<sub>2</sub> allows the same reflash hazard, as does PKP. Cool all hot spots thoroughly to prevent reignition. Note also that CO<sub>2</sub> is very poor as a Class B extinguishing agent. Vapor fires can burn within a cloud of CO<sub>2</sub>.



### Section G. Electrical System

### **Overview**

#### Introduction

The 41'UTB has electronic communication and navigation equipment to aid the crew in accomplishing assigned missions. For detailed information on the functions, features, and operation of the individual equipment items, refer to appropriate owner's manual or contact an electronics technician for assistance.

#### In this section

Topic	See Page
Power	3-36
Electrical Panels	3-37
Navigation Lighting System	3-43
Communications	3-44
Navigation	3-45



#### **Power**

#### G.1. Batteries

The 41' UTB has a bank of two 12-volt, 200-amp hour rated batteries connected in series, producing 24 volts DC. They are used to start the main engines and provide power for the 24-volt electrical and 12-volt electronic systems. (Also see Figure 2-3 and Section 2.H.3.)

#### WARNING 💖

Battery terminals must be covered with a protective rubber boot to prevent electrical shock.

### G.2. Battery charger

A 110V AC battery charger is on the engine room side of Bulkhead 6, outboard of the starboard main engine. The charge-on-demand type battery charger is installed in the 110V AC shore-tie side of the electrical system. It maintains a positive charge on the batteries while main engines are secured and shore power is provided. (Also see Figure 2-3 and Section 2.H.3.)

#### NOTE &

The battery charge rate depends on the condition of the batteries and demand for power from the batteries while charging.

### WARNING 💖

Always use extreme care when handling batteries. Batteries contain a sulfuric acid solution. This acid will cause severe burns and is extremely corrosive. During recharge, batteries generate hydrogen gas, which is highly explosive and toxic. Therefore, never smoke around a battery, or disconnect a battery until the space has been thoroughly ventilated. Do not store or keep batteries in covered containers that might trap the hydrogen gas.

### G.3. Battery equalizer

The 12V battery equalizer balances VOC power distribution and supplies it to the 12V power panel in the pilothouse for the electronics. (Also see Figure 2-7 and Section 2.D.27.)

#### G.4. Starters

A 24-volt, Delco-Remy starter is on the port side of each main engine.

### G.5. Alternators

Each main engine has a heavy-duty, 24-volt, 75-amp, marine alternator with internal voltage regulator. The voltage regulator is factory-adjusted to allow a charge of 28.4 volts. The alternators are designed for parallel operation. Their output is based on the electrical demand placed on the batteries with engines running.



### **Electrical Panels**

### G.6. Electrical control panel

This panel, located on the port side of the steering console, has rocker switches and rotary control knobs (See Figure 3-13). It controls power to:

<b>Rocker Type Control</b>
Switches

- both bilge pumps
- blue rotating light
- console binnacle
- aft deck floodlight
- docking lights

#### Rotary Control Knobs

- binnacle light dimmer control
- instrument light dimmer control
- navigation lighting system selection knob
  - navigation lights off
  - anchor light
  - running lights, no tow
  - running lights tow astern (inland)
  - running lights towing alongside (int'l waters)
  - running lights towing alongside (inland waters)

### G.7. Windshield wipers

The three, individual, rocker-type windshield wiper control switches are on a separate panel inboard of the steering console electrical control panel. (See Figure 2-13 for location perspective.)

### G.8. 24/28 DC electrical panel

This panel is located in the pilothouse port bulkhead (See Figure 3-14), under the window. It distributes power to all 24/28V DC electrical systems. (See Figure 2-12 for location perspective and Section 2.E.37.)

### G.8.a. Voltage meter

The DC breaker panel has a voltage meter at the top left side that indicates the battery charge.

### G.8.b. Amperage

The DC panel has an ammeter to the right of the voltage meter that indicates the amperage load on the batteries by the boat's electrical systems and electronic equipment.



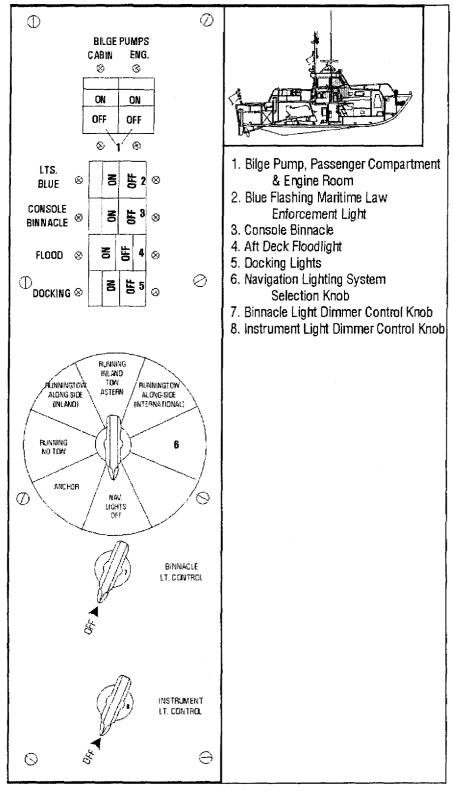
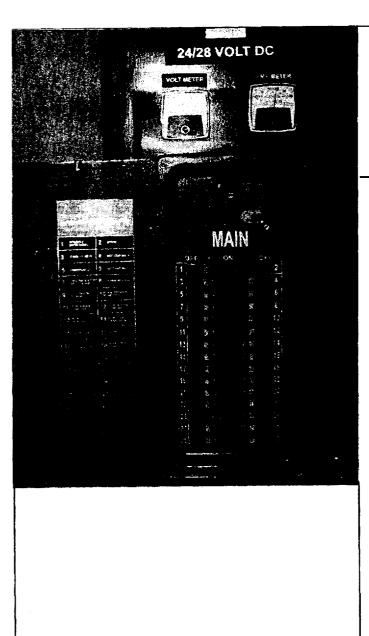
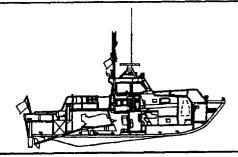


Figure 3-13
Steering Console Electrical Control Panel





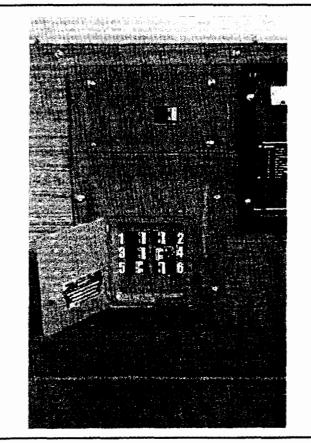


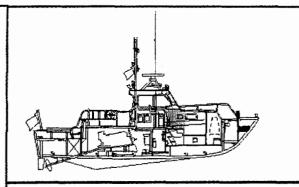
#### **Breaker Switch Numbers**

- 1. Console Display Panel
- 2. Spare
- 3. Cabin Light (Red)
- 4. Hot Cup No. 1
- 5. Forepeak Light
- 6. Hot Cup No. 2
- 7. Engine Room & Storage Space Light
- 8. Cabin Heater
- 9. Pilothouse & Cabin Light
- 10. Pilothouse Heater
- 11. STBD Engine Starter
- 12. Port Engine Starter
- 13. Main Search Light
- 14. Portable Search Light
- 15. Chart Table Light (Red)
- 16. Horn
- 17. Engine Alarms
- 18. Navigation Lights
- 19. Spare
- 20. Spare
- 21. Spare
- 22. Spare
- 23. Spare
- 24. Spare
- 25. Halon Alarm and Bilge/Fire Alarm
- 26. Windshield Washer Pump
- 27. Spare
- 28. Spare
- 29. Cabin Heater Booster Pump
- 30. Defroster Booster Pump and Blower

Figure 3-14
24/28 V DC Circuit Breaker Panel







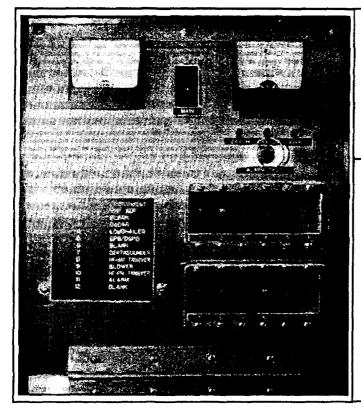
- 1. Battery Charger
- 2. 110V AC Electrical Test Receptacle (pilothouse & passenger compartment)
- 3. 110V AC Port Engine Heater
- 4. 110V AC Starboard Engine Heater
- 5. Passenger Compartment Heater
- 6. 110V AC Engine Room Receptacle

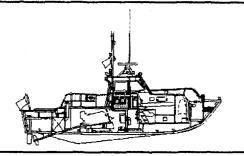
Figure 3-15 110V AC Circuit Breaker Panel

### G.9. 110V AC electrical panel

This panel is located in the pilothouse port side bulkhead under the window. It distributes 110V AC shore power to those systems requiring AC power while in port. (See Figure 2-12 for location perspective and Section 2.E.36.)







#### Breaker Switch Numbers

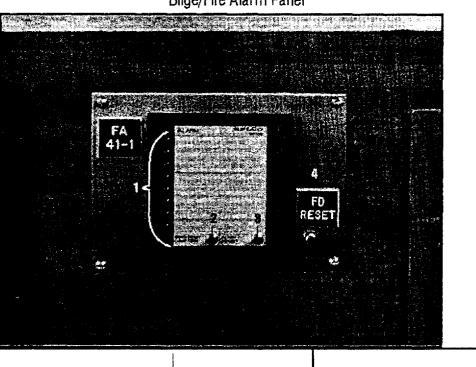
- 1. VHF ADF
- 2. Spare
- 3. Radar
- 4. Loudhailer
- 5. GPS/DGPS
- 6. Blank
- 7. Depthsounder
- 8. HF-AM Transmitter
- 9. Blower
- 10. VHF-FM Transceiver
- 11. Alarm
- 12. Blank

Figure 3-16
12V DC Circuit Breaker Panel

G.10. 12V DC circuit breaker panel

This panel is in the pilothouse port bulkhead, between the 110V AC electrical panel and Bilge/Fire alarm panel. It distributes power to all electronic equipment. (See Figure 2-12 for location perspective and Section 2.E.37.)





Bilge/Fire Alarm Panel

1. Alarm Indicator Lights

- 2. Power Indicator Light
- 3. Alarm Test/Silence
- 4. Fire Detector Reset Button

Figure 3-17 Bilge/Fire Alarm Panel

### G.11. Bilge/fire alarm panel

This panel is located in the pilothouse port bulkhead, just aft of the 24/28V DC power panel. It monitors the two bilge alarm floats and also the smoke detector in the pilothouse. In the event the bilge or fire alarm is activated, the blue light and horn will be energized. (See Figure 2-12 for location perspective and Section 2.E.38.)



### **Navigation Lighting System**

### G.12. Operation

The navigational lights rotary control switch is a multi-function switch. It is wired to allow selection of different navigational light combinations. Circuit breaker #18 in the 24/28V DC circuit breaker panel energizes the circuit for the switch. (See Figure 3-13 for the available lighting combinations.)

### G.13. Mast lights

The required color and arc of visibility for each navigation light on the mast is indicated below:

Light	Color	ARC
Anchor	White	360°
Masthead	White	225°
2nd Masthead	White	225°
Stern	White	135°
Towing	Yellow	135°
2nd Towing	Yellow	135°

### G.14. Side running lights

The navigation lights on each side of the pilothouse have color and arc of visibility as indicated below:

Light	Color	ARC
Port	Red	112.5°
Starboard	Green	112.5°



### Communications

#### G.15. Radios

There are three types of radios that may be found on the 41'UTB.

- VHF-FM radio
- VHF-FM guard radio
- HF-SSB radio

### G.15.a. VHF-FM radio

This is the boat's main communications tool. It is a FM radio covering the VHF-FM frequency range of 146-175 MHz. This radio has a built-in voice-scrambling feature. It is located in the Electronics Console (See Figure 2-16).

### G.15.b. VHF-FM guard radio

This radio is a guard radio for VHF-FM Channel 16. It can also be used as a backup radio for the main VHF-FM radio. It is installed in the Electronics Console (See Figure 2-16).

### G.15.c. Raytheon Ray-152 HF-SSB radio

This radio serves as a backup radio if there is a VHF-FM radio failure, in unique operating areas where VHF-FM communication is difficult due to excessive traffic, and when HF communication with other maritime vessels is necessary. It is mounted adjacent to the navigator's chair under the starboard window Console (See Figure 2-17).

### G.16. Direction finder

The 41' UTB is equipped with the CFM-IES-KDF VHF-FM Direction Finder. This radio direction finder (homer) allows homing on the source of a FM radio signal. The unit can also function as a backup VHF-FM receiver (e.g., for continuous monitoring of VHF-FM Channel 13). It is located in the Electronics Console (See Figure 2-16).

#### G.17. Loudhailer

The RAYTHEON RAY-430 Loudhailer is a multi-purpose, sound generation (fog signal) and sound amplification (listening) device. It is located in the Electronics Console (See Figure 2-16).



### **Navigation**

### G.18. Depth finder

The Autohelm ST-50 Depth Finder indicates depth in feet or fathoms. A hull-mounted transducer sends a series of high frequency sound waves to the bottom. The depth finder measures the time duration from the transmission to return of the wave and changes it to a digital depth reading at the display head. The unit is equipped with a low water alarm that can be set to any depth. The transducer penetrates the hull shell plate 2 feet above the bottom of the skeg. The depth finder can be offset for 2 feet to give an accurate reading of water below the skeg on the display head. The display head is mounted on top of the Steering Console hood to the right of the compass Console (See Figure 2-13).

#### G.19. Radar

The 41' UTB is equipped with a Raytheon RASTER Scan Radar. The AN/SPS-69 radar incorporates many features that will assist the coxswain in safe navigation. It is installed in the Electronics Console. Some features are briefly covered below Console (See Figure 2-16).

### G.19.a. Range settings

Range settings are available from <sup>1</sup>/<sub>8</sub> NM to 48 NM. The <sup>1</sup>/<sub>8</sub> NM range scale enhances navigation in tight channels or close-quarters situations.

### G.19.b. Offset display mode

This feature allows movement of the boat's position from the center of the screen to any location within the range scale selected. The offset mode allows selection, preposition, and display of the boat's most vulnerable quadrant in greater depth for collision avoidance.

### G.19.c. DGPS interface mode

The AN/SPS-69 radar is the first Coast Guard small boat radar with the combined capability of full-function radar and DGPS information display.

### G.20. DGPS receiver

The Leica Differential Global Positioning System (DGPS) is a programmable, multifunction unit. The key functions this set provides are discussed below.

Features	Description	
Waypoint	Unit is programmable up to 200 navigational	
	waypoints at one time.	



Cross Track Error	Displays your vessel position relative to either on course or right or left of the base course line while transiting between two waypoints.
Two Plotter Displays	Provides a graphical representation of the boat movement.
Man-Overboard	When activated, stores the position, time, and date of the event plus activates a man overboard plotter display.
Calculator Function	Calculates math problems, latitude and longitude conversion problems, and addition and subtraction of times.
Datum List Enables a match between the unit positioning information with datum on most any chart.	
Automatic Magnetic Variation	Automatically compensates for magnetic bearing information.



### Chapter 4 The Crew

#### **Overview**

#### Introduction

The 41' UTB is one of the most commonly recognized symbols of the U.S. Coast Guard. The Coast Guard places great trust in the abilities of its boat crews to perform the sorties and missions assigned to them. The professional seamanship skills and knowledge required of a crew to safely and efficiently complete an assigned mission, are developed through underway training and operations in the environment their boats are designed to handle. Members of an assigned crew should develop confidence-building skills under relatively safe conditions before using their skills under maximum conditions. The Coast Guard has established minimum standards and guidelines for building skills which are a part of the certification process required by the Boat Crew Training Manual, COMDTINST M16114.9 (series). The general duties of the crew are described in this chapter.

### In this chapter

Section	Title	See Page
A	Crew Size	4-3
В	Boat Crew	4-5





### Section A. Crew Size

#### A.1. General

The minimum crew for a 41' UTB is three - coxswain, engineer, and crew member. Due to the small size of the crew, cross-training in the duties of other positions is essential. Additional members may be required during special operations. Where local staffing permits, additional crewmembers should first ride in a training capacity to increase their proficiency with the boat's equipment and operation.





### Section B. Boat Crew

#### **B.1.** Coxswain

The coxswain is in charge of the boat and its crew during all sorties and missions. Coxswain certification and currency is required. The coxswain represents the commanding officer or officer-in-charge, and has authority and responsibility independent of rank or seniority. Coxswains must be familiar with Coast Guard Regulations, COMDTINST M5000.3 (series), which outlines this relationship.

The coxswain is responsible, in order of precedence, for:

- · safety and conduct of passengers and crew,
- safe operation and navigation of the boat,
- completion of the sortie or mission(s),
- safeguarding of life and property, and
- compliance with Federal laws and regulations.

#### **B.2.** Engineer

The engineer must be certified and current both as an engineer and a crewmember. The engineer assists the coxswain as directed and is responsible for:

- engines and all power equipment; and
- assisting in boat navigation, line handling, lookout, towing watch, or helmsman.

### B.3. Crew member

The crew member must also be certified and current and assists the coxswain as directed. The crew member is responsible for:

- securing the boat's equipment;
- line handling; and
- serving as a lookout, towing watch, firefighter, swimmer, or helmsman.

### Operators Manual - 41' UTB





### Section A. Operating Parameters

#### A.1. General

The readiness of the 41' UTB shall be continuously monitored to ensure that it is capable of unrestricted operations. This monitoring is accomplished through a variety of programs, including daily boat checks, the boat PMS schedule, annual engineering inspection, annual Ready for Operations (RFO) evaluations, and biennial Standardization Team Visits.

For the purpose of this section, operational commanders are defined as commanders of groups, activities, air stations, districts and Greater Antilles Section, who exercise direct operational control of a subordinate unit with a standard boat. (See Chapter 1, Coast Guard Boat Readiness and Standardization Program Manual, COMDTINST M16114.24 (series).)

Operating parameters for the 41' UTB and crew members include the following areas.

### A.2. Disabling casualties

Disabling casualties are those which make the boat not serviceable. Appendix E contains a listing of disabling casualties. If a disabling casualty is identified when the boat is moored, the boat shall not get underway until the casualty is corrected.

#### NOTE &

The operational commander may authorize, in writing, the movement of the boat (for short distances) under its own power only to facilitate haul-outs or corrective maintenance. In the event that the boat sustains a disabling casualty while underway, the boat shall immediately return to the nearest safe mooring, if able. In many cases the boat will require assistance from another vessel.

Disabling casualties shall be reported to the operational commander by the most expeditious means; followed by a boat status message as soon as possible but no later than 12 hours after the casualty is discovered. The boat shall be immediately placed in Charlie status and repaired. If the casualties cannot be repaired within 48 hours, a CASREP shall be sent within 24 hours of the casualty.

### A.3. Restrictive discrepancies

Restrictive discrepancies are those which restrict the operations of the boat such that it can perform some missions, but not all missions safely. Appendix F contains a listing of restrictive discrepancies.



# A.3.a. Reporting restrictive discrepancies

Restrictive discrepancies shall be reported to the operational commander if the discrepancy cannot be repaired within 1 hour. The boat shall be immediately placed in a Charlie status and shall not get underway until the discrepancy is corrected, or a waiver has been received. If the discrepancy cannot be repaired within 48 hours, a CASREP shall be sent within 24 hours of the discrepancy. The operational commander is responsible for monitoring the progress of repairs to these discrepancies.

#### A.3.b. Waivers

Boats with restrictive discrepancies shall only be operated if the operational commander has issued a written waiver. The waiver shall:

- 1. list the discrepancy,
- 2. describe the conditions under which the boat may be operated, and
- 3. concurrence on the measures to be taken to lessen or negate the hazard posed by the discrepancy.

A verbal waiver is authorized, as long as a written waiver follows it up within four hour.

# A.3.c. Discrepancy underway

In the event the boat sustains a restrictive discrepancy while underway, the coxswain should not normally proceed without authorization, unless aborting the mission would increase the level of risk to the person(s) or vessel being assisted. The situation and recommendations must be effectively communicated to the operational commander to allow for prudent risk assessment by all levels.

The reporting procedure is as follows:

Step	Procedure
1	The coxswain shall immediately notify the parent unit with all pertinent information and a recommendation as to whether to continue or abort the mission.
2	The parent unit shall pass along the information pertaining to the casualty, the current mission, and recommendations to the operational commander.
3	The operational commander shall immediately notify the unit as to whether or not continuing the mission is authorized, and the conditions under which the boat may be operated.



### A.4. Major discrepancies

Major discrepancies are those that degrade the effectiveness of the boat to perform one or more missions. Appendix F contains a listing of major discrepancies. The occurrence of major discrepancies shall be documented. A plan to correct these discrepancies shall be formulated and carried out. The operational commander is responsible for monitoring the status of repairs to these discrepancies.

### A.5. Minor discrepancies

Minor discrepancies do not affect the operational readiness of the boat. However, a boat with minor discrepancies does not meet the standardization criteria established for the boat. The occurrence and repair of minor discrepancies shall be documented and monitored at the station/unit level.

In the event that the addition of portable equipment, not part of the standard boat outfit, is necessary to meet mission needs, units are authorized to temporarily carry this extra equipment. This authorization is on case by case basis only, and care must be taken to properly secure any extra gear and to ensure it does not interfere with safe egress or the boat's standard outfit/systems. Under no circumstances shall permanent alterations be made to power, stow, or in any way accommodate extra equipment.

### A.6. Responsibilities

The coxswain is always responsible for the safe operation of the boat. The coxswain must decide if the mission warrants subjecting the crew and boat to the danger defined by the mission, weather and sea conditions anticipated.

A.6.a. Disabling casualty – underway

In the event that the boat sustains a disabling casualty while underway, the boat shall immediately return to the nearest safe mooring, if able. In many cases the boat will require assistance from another vessel.

A.6.b. Restrictive discrepancy – underway In the event the boat sustains a restrictive discrepancy while underway, the coxswain should not normally proceed without authorization, unless aborting the mission increases the level of risk to the person(s) or vessel being assisted. The situation and recommendations must be effectively communicated to the operational commander to allow for prudent risk assessment by all levels. The following is the procedure for communicating the discrepancy while underway:

Step	Procedure		
1	The coxswain shall immediately notify the parent unit with all pertinent information and a recommendation as to whether to		
	continue or abort the mission.		



Step	Procedure  The parent unit shall pass along the information pertaining to the casualty, the current mission, and recommendations to the operational commander.		
2			
3	The operational commander shall immediately notify the unit as to whether or not continuing the mission is authorized, and the conditions under which the boat may be operated.		

Casualty/Discrepancy	Consequence	Required Action
Disabling Casualty  "Boat is not serviceable"	Not authorized to get u/w*.  Notify operational commander immediately by most expeditious means; follow up by a boat status message.	Assign "Charlie" status to the boat, and commence repairs immediately. Submit CASREP if applicable.
Restrictive Discrepancy  "Boat and crew cannot perform all missions safely."	Operations restricted.  Notify operational commander if repairs cannot be made in 1 hour.	Create repair plan and set deadline for completion of repairs. Operational commander shall monitor progress of repairs. Any operations before restrictive discrepancies are repaired require written waiver (See A.3.b. above) from the operational commander. Submit CASREP if applicable.
Major Discrepancy  "Boat and crew can perform all missions but some degradation in effectiveness or readiness should be expected."	Operations unrestricted.  Discrepancy occurrence, and repair is documented.	Maintenance plan is carried out, operational commander shall monitor status of repairs to the discrepancies.
Minor Discrepancy  "Boat and crew readiness not affected nor impaired. Boat does not meet standards."	Operations unrestricted.  Discrepancy occurrence and repair is documented.	Maintenance plan is carried out. Station CO/OIC monitors completion of maintenance/repair.



# A.7. Towing and environmental limits

The boat was designed and built for the following conditions:

- operating in near shore waters and moderate weather conditions;
- towing of vessels up to 100 gross tons; or
- weather and seas not to exceed:
  - 30-knot wind;
  - 8-foot seas; or
  - large breaking waves, surf, or breaking bar conditions.

#### NOTE &

These limits may be exceeded by approval of the operational commander, **only** after appropriate risk assessment for the situation at hand is made. On-scene conditions provided by the on-scene commander and coxswain must be considered in the risk assessment process. The coxswain retains the final on-scene decision as to whether or not an action may be safely executed.

# A.8. Mission equipment limits

Mission equipment limits are mission specific and must be considered during the mission risk assessment. The lack of/failure of certain items limit boat mission capability. Their lack or failure does not prevent the 41' UTB from getting underway in an emergency:

#### NOTE &

VHF-FM Radio

For operations more than 10 miles offshore, failure of the GPS becomes a disabling casualty. For operations when visibility is less than 1 mile, failure of the radar becomes a disabling casualty.

- Depth Finder
- GPS (DGPS) (if operating less than 10 mile offshore)
- Radar (if visibility is greater than 1 mile)
- Towline A minimum of 500' of 2-34" DBN, not including the anchor line, must be on board before assigning this boat to a SAR mission with potential for towing.

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### Section B. Performance Data

### B.1. Fuel consumption

Performance and fuel consumption (or operating range) are affected by:

- engine tuning;
- weather conditions;
- operating trim (speed, load, etc.);
- evolutions being performed (towing, searching, etc.); and
- operating area (shallow water increases wave-making resistance).

The average fuel consumption based on engine RPMs are indicated below (both engines operating):

RPM	Gal/Hr
800	4.0
900	4.5
1000	5.5
1100	7.5
1200	9.2
1300	10.2
1400	12.1
1500	13.5
1600	15.0
1700	17.0

RPM	Gal/Hr
1800	19.5
1900	22.0
2000	24.1
2100	27.5
2200	29.0
2300	31.5
2400	33.5
2500	37.2
2600	40.0

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### Section C. Starting Procedures

#### C.1. Pre-start

Before starting a cold engine and before each mission, carry out the following steps:

Step	Procedure	
1	Be sure all bilges are free of unsecured equipment or materials (e.g., loose rags, tools, or cleaning gear).	
2	Be sure all bilges are free of fuel, oil, and water.	
3	Check the main engine and the marine gear oil levels. Add oil only as necessary to bring the level to the "H" mark on the dipstick. Do not overfill; damage to the engine seals may result.	
4	Be sure raw water coolant system sea strainer baskets are clean.	
5	Be sure fuel tank high suction valves are open.	
6	Ensure priming and stripping valves in the fuel supply system are closed.	
7	Open the raw water cooling system valves for each main engine at the sea chest.	
8	Check main engine coolant level in the heat exchanger. It should be approximately 2" below the fill neck. Add coolant only as necessary.	
9	Check alternator belts for proper tensionno greater than <sup>7</sup> /16" depression per foot of span.	
10	Use the sounding rods to sound each fuel tank. Record the amount of fuel in each tank on the unit's daily boat checkoff sheet. Fuel level should be at or near 231.5 gallons (95%) per tank.	
11	After securing shore-tie power at the 110 VAC circuit breaker and on the pier, remove the shore-tie plug and screw the protective cover over the receptacle on the boat.	
12	When the shore-tie cable is moved to the pier, protect the shore-tie plug from the elements with the attached rubber cap.	

### NOTE &

When the engine is secured, the marine gear oil level (full) should be above the "H" mark on the dipstick. The marine gear oil level must be re-checked after the engine is started and idling to confirm the correct level on the dipstick.

#### **CAUTION!**

Never start or run the engines with the shore-tie power energized. Damage to the alternator may occur.



#### C.2. Starting

To start the main engines, you must do the following steps, in the order listed:

	Step	Procedure	
	1	At the 24/28V DC circuit breaker panel, place circuit breaker #11 and #12 (port and starboard main engine starting motors) and #17 (main engine alarms) in the ON position. All other circuit breakers must be in the OFF position.	
	2	Be sure the engine alarm bell toggle switches on the steering console are in the ON position.	
	3	Be sure the Morse Controls are in neutral.	
CAUTION!	4	Push down the main engine fuel stop cables (T-handles). This opens the fuel supply system for the main engines.	
Do not depress both starter buttons	5	Depress the main engine starter button and hold until the engine starts.	
simultaneously. Start engines one at a time.	6	If an engine does not start within 30 seconds, release the start button, let stand 2 minutes, and repeat the procedure. During the 2-minute waiting period, ensure steps 1 and 4 above were completed. If after four tries the main engine will not start, consult the troubleshooting chart on page 36 of Diesel Main Propulsion Unit for VT-903M.	
	7	After the main engine has started, check for adequate lube oil pressure and overboard raw water coolant discharge from the exhaust end pipe at the transom.	
	8	With one main engine started and idling, repeat steps 4, 5, and 6 to start the other engine.	

#### C.3. Post-start

With both engines started, the following post-start inspection must be done:

### **Pilothouse Steering** Console

Step	Procedure	
1	Ensure forward and astern propulsion for engines are operable.	
2	Check the following gauges:	
	• main engine lube oil gauges,	
	marine gear lube oil pressure gauges, and	
	main engine jacket water temperature gauges.	



#### **Engine Room**

Step	Procedure		
3	Check the following items for discrepancies and correct and report		
	• jacket water system and raw water system for leaks,		
	main engine and marine gear for lube oil leaks,		
	• fuel oil system for leaks,		
	marine gear oil level, and		
	exhaust leaks.		

#### NOTE &

With the main engine at idle, the oil level of the marine gear must be between the "L" and "H" marks on the dipstick. If additional oil is required, you MUST secure the main engine for the affected marine gear before adding the oil.

## C.3.a. Warm up diesel engine

Diesel engines are best warmed-up under load. When practical, get underway as soon as the checkoff procedures are completed. If upon completion of post-start inspection the main engines have not warmed-up, increase main engine idle speed to 1000 RPMs for a short warm-up period. To do this:

Step	Procedure
1	Be sure the marine gear is in neutral position and the main engine is at idle speed (RPM).
2	Pull the throttle arm out from the Morse Control mechanism where it makes the 90° turn into the Morse Control mechanism (note the indentations in the lower portion of the throttle arm) disengaging the marine gear actuating cable from the throttle mechanism.
3	With the throttle handle pulled out, move the throttle in either direction to increase main engine RPMs.
4	Adjust the main engine speed (RPM) by moving the Morse Control throttle handle further in the direction selected until the tachometer reading matches the desired RPMs.

## C.3.b. Energize circuit breakers

At the 24/28V DC circuit breaker panel, energize all the remaining circuit breakers for the electrical equipment to be used. At the 12V DC circuit breaker panel, energize all the circuit breakers for the electronics.

#### Chapter 5 - Operations





### Section D. Underway

#### D.1. Gauges

After getting underway, closely observe the steering console gauges. They indicate system operating conditions. Gauge readings should be within following ranges:

Gauge	Idle	Cruising
Tachometer	700-725 RPM	2,000 RPM
Engine Oil Pressure	10-30 psi (after warmed up)	45-65 psi (30 minimum)
Gear Oil Pressure	25-70 psi	190-220 psi
Water Temperature		175-185° F

## **D.2.** Corrective action

During boat operations, if change occurs in any of the systems (e.g., abnormal gauge readings, vibration, or unusual handling characteristics), take corrective action to prevent further damage. Refer to the troubleshooting chart on page 36 of 41' UTB Service Manual TP 041-004 and the engineering casualty control section of the Boat Engineer Qualification Guide, COMDTINST M16114.6 (series).

#### D.3. Throttles

The 41' UTB responds quickly to the throttles. Increase speed gradually to allow engines to warm-up thoroughly. Unless absolutely mission essential, avoid rapid increases in speed when main engines are cool or cold.





### Section E. Handling Characteristics

#### **Overview**

#### Introduction

Boat handling is a complex skill that requires extensive knowledge and practical underway experience to build confidence and skill levels.

#### NOTE &

The Boat Crew Seamanship Manual (BCSM), COMDTINST M16114.5(series), provides a large amount of information on boat handling. Read and become thoroughly familiar with it. Sections in the BCSM cover:

- various forces affecting boat handling;
- effect of propellers and rudders;
- boat handling, twin screw and single screw (one engine disabled); and
- boat handling in a narrow channel.

The BCSM also addresses boat operations in the various conditions briefly discussed in this section.

#### In this section

Topic	See Page
Maneuverability	5-18
Head Seas	5-20
Dead in the Water	5-21
Beam Seas and Following Seas	5-22
Inlets	5-24
Capsize Prevention	5-25
Towing in Heavy Weather	5-27
Ice Operations	5-28



### Maneuverability

#### E.1. General

With its powerful twin diesel engines, propellers and rudders, one person can easily operated the 41' UTB from the pilothouse. An experienced coxswain can steer, turn, and dock this boat with minimal rudder use. However, this boat is designed with a wide transom for working space and planing lift for speed in relatively smooth water. These features, desirable for fair weather, can easily become highly undesirable characteristics in foul weather. Safe operation requires the following actions:

Step	Procedure  Take into account the boat limiting factors.		
1			
2	Continuously monitor the prevailing weather and sea conditions.		
3	Know the boat and its positive handling features, as well as the crew's limitations.		

## E.2. Main engine RPMs

The maximum safe operating RPM for this boat is 2,700 (approximately 26.5 knots). However, during normal operations never use more than 90 percent of the main engines' maximum safe operating RPMs. This 90 percent figure equates to a normal main engine operating limit of 2,430 RPMs (approximately 22 knots). The 10 percent extra power and speed is the boat's main defense in most threatening situations.

#### E.3. Stopping

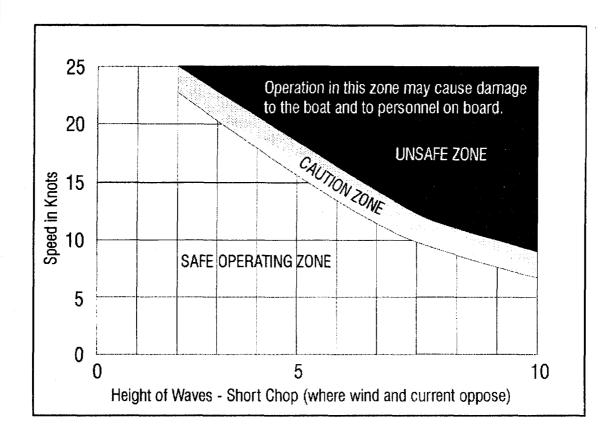
#### WARNING 💖

Do not use this method of stopping except in an emergency. Main engine and/or marine gear damage is likely. Serious personnel injury is possible if a warning is not given.

To shift from ahead to reverse, bring the Morse Control throttle handle from the ahead position smoothly to the neutral position, pause, and then into reverse. Make the change from ahead to reverse position allowing adequate time for the main engines, marine gears, shafts, and propellers to slow to nearly a stop. In an extreme situation, moving the throttles directly from ahead to full astern can stop the boat very quickly. Tests going from full ahead to full astern showed the boats are able to stop in 70 feet, with an elapsed time of 3 to 4 seconds.



The following chart gives the upper limits which should be observed when operating in the given sea states. The upper limits should not be exceeded. In addition, the shape and period of the seas may sometimes require even slower speeds to avoid hull damage.



Seas (short chop)	Engine RPMS	Speed in Knots
• • • • • • • • • • • • • • • • • • • •		
0 – 2	2300 – 2700	21 – 26.5
2 – 4	1900 - 2300	16 – 21
4 – 6	1700 – 1900	12 – 16
6 – 8	1300 – 1700	9 – 12
8 - 10	1000 - 1300	7 - 10

Figure 5-1
Safe Operating Zone



#### **Head Seas**

## E.4. Operating in head seas

Traveling into head seas normally presents no problems if operations remain within the defined wind and sea limiting factors. Remember the following key operational factors:

# E.4.a. Maintain maximum steering control

To maintain maximum steering control, keep the rudders and propellers as deep in the water as possible.

## E.4.b. Protect the pilothouse

To protect the large, nearly vertical pilothouse windows in large head seas, apply ample power just before passing through the crest of the wave. This will cause the bow to lift and prevent head seas from breaking fully onto the cabin and pilothouse windows.

### **WARNING** ♥

To go through "white water" at the crest of a wave, maintain headway and just as the white water hits the bow, open the throttles so the bow lifts. This avoids the tendency for water to break over the bow and back onto the windshields. Crewmembers must hold on firmly with knees flexed during such maneuvering.

#### E.4.c. Buoyancy

The buoyancy of the wide, flat stern of the 41' UTB has a greater lifting factor than the bow. When operating at or near the 8-foot maximum sea limiting factor, the coxswain must maneuver constantly using both the rudders and main engines to keep the bow from burying into the seas.

#### **CAUTION!**

Avoid at all cost "flying through" the crest. Becoming airborne on the back of a wave places severe stresses on the hull and crew as the boat lands. Serious personnel injuries are likely. The boat and crew can not survive repeated flights of this kind.



#### **Dead in the Water**

# E.5. Operating in calm conditions

During calm weather and sea conditions, any wind will cause the 41' UTB to lay with its stern into the wind and the bow away from the wind. This is due to the boat's high superstructure and its shallow draft forward. To maintain positive control, maintain minimum steerageway. The pivot point of the 41' UTB is at its pilothouse, amidship.

#### **WARNING** ♥

Basin model tests show that a 41' UTB (fully loaded condition) will capsize when dead in the water if hit by a 15-foot breaking wave on the beam or broad on the bow. Capsizing will probably be instantaneous with little time to react.



### **Beam Seas and Following Seas**

## E.6. Operating in beam seas

Operating with the seas on the beam is more uncomfortable than dangerous when you follow basic small boat handling guidelines. The danger exists when operations occur in conditions that approach or exceed wind and sea limitations. Use the following techniques to minimize danger:

#### E.6.a. Tacking

With large seas on your beam, tack across the seas at a slight angle in a zigzag fashion. This prevents exposure of the beam to heavy swells.

### E.6.b. Changing course

To change course heading, allow the boat to lose headway, turn the wheel hard over, and apply power to come smartly to the new heading.

## E.6.c. Exercise caution

Do not allow the boat to become dead in the water and be hit broadside by a wave.

#### WARNING 💖

The position of the boat in relation to a breaking wave crest is critical. Severe wave slap will occur in the area approximately two boat lengths in either direction of the breaking water, however this area presents less danger of capsize.

## E.7. Operating in following seas

Following seas present the greatest dangers to the 41' UTB. The utility boat doesn't have the balanced buoyancy or ability to lay-to in a following sea like a motor lifeboat. With the wide flat stern, large following seas become a serious problem. The operational limitations are the controlling guideline and must be followed at all times. Consider the following points and techniques when operating under these conditions:

Operation in a following sea involves a risk of surfing on the face of a swell or breaker. This situation is extremely dangerous. Control of the boat may be impossible.

Do not power the boat over the crest of a wave and into the trough of the next wave or bury your bow into the back of the next wave.



The 41' UTB has the tendency to slip down the back of seas, heeling heavily at the bottom or trough.

IF	THEN	
If the boat is being pulled back,	increase the throttles to gain additional forward momentum	
If the boat continues being pulled back	be alert for "sluggish" helm response and higher engine RPM (cavitation).	
If either situation occurs,	Immediately back off the throttles losing forward momentum, then apply full throttle and rudders and try to kick out of the wave.	
If riding the back of the wave is not possible,	try to prevent seas from overtaking, breaking under, or breaking over the transom.	

#### **CAUTION!**

Carefully observe the seas off the stern to ensure maneuvering room.

## E.8. White water

If you observe white water overtaking from astern, quickly stop all forward motion and gain sternway before the white water reaches the propellers and rudders. If this is not possible another option is to come about smartly, present the bow to the sea, and gain sufficient headway to establish rudder and throttle control before the white water reaches the boat. Again, carefully observe the seas off the stern to ensure maneuvering room.



### **Inlets**

## E.9. Entering an inlet

### WARNING ♥

Do not transit a breaking bar or inlet.

It is very difficult to judge the sea conditions in an inlet from seaward. WHEN IN DOUBT, STAY OUT. Crew fatigue, risk assessment by the coxswain, and sound judgement are extremely critical at this point. Shallow water, steeper, closer waves, and restricted maneuvering greatly increase demands on the boat, as well as the coxswain. Again, the operational limitations are the controlling guidelines. Follow them at all times.

### E.10. Breaking waves

If the boat enters an inlet where breaking waves are present, and the boat is committed and cannot turn around, take immediate action and follow these precautions carefully:

Step	Procedure
1	Immediately notify your unit by radio of the situation.
2	Maintain a 360° lookout.
3	Immediately station a stern lookout at the pilothouse door with instructions to warn of large or breaking waves overtaking the boat or threatening situations.
4	Maintain position squarely on the back of the wave.
5	Carefully gauge speed to hold position on the back of waves. If possible, do not use all of your power; keep additional power in reserve for emergency maneuvers.
6	Keep the rudders and propellers as deep as possible to maximize rudder and propeller response and control.
7	Keep the stern before the sea, slightly quartered. Do not let the bow fall off. This increases the possibility of broaching.
8	If the sea shows a tendency to gather speed and accelerate to the point of breaking, keep the seas breaking ahead of and astern of the boat. Do not allow the boat to enter this "white water" area.

#### **CAUTION!**

Maintain your position ahead of breaking waves. If a wave is close to breaking astern, open the throttles immediately to open the distance. Do not wait until the wave overtakes the boat. At this point, the boat will have lost rudder and throttle control.



### **Capsize Prevention**

#### E.11. Statistics

As of 1999, three 41' UTBs have capsized--two with loss of life. All three incidents happened while operating in large breaking waves or surf.

### situation

**E.12.** Assess the If a life-threatening situation does not exist, departure from the safe operating limits may create one. Use good judgement and proper risk assessment if called on to exceed those limits. Consider whether lives are clearly in danger. Consider whether the 41' UTB is the best resource available. Departing from the established operational limits will severely test the coxswain and crew. Boat crew survival may quickly replace mission performance as the primary concern.

#### E.13. Operate within limitations

If the operating limits are exceeded, the boat will be in a "danger zone." The chances of capsizing are greatest while operating in the danger zone. Nearshore, conditions frequently occur which could easily place a boat in the danger zone.

#### WARNING 💖

Strictly observe the operating limitations of the 41' UTB. Avoid breaking waves or surf. Remain with the boat if it capsizes. With watertight integrity set, the 41' UTB will remain afloat for some time if capsized. Remain with the boat to stay afloat; keep the crew together to aid search and rescue.

#### E.14. Capsizing conditions

The force needed to capsize the 41' UTB is most likely to come from heavy following seas or large breaking waves striking on the beam.

A number of capsizing reports have been reviewed. Some of the conditions listed were present in each capsizing:

- breaking waves 8 feet or higher;
- water depth less than 20 feet;
- entering shallow water due to navigational error;
- tidal current ebbing or the boat proceeding against a strong tidal current with steep, following seas;
- escorting or towing another boat through an inlet;
- restricted visibility due to darkness, rain, and fog; and
- reduced stability due to low fuel level, excessive water in bilges, or topside icing.



# E.15. Corrective action

#### NOTE &

Always observe the service requirements for wearing hypothermia protective clothing, personal flotation devices, and boat crew signal kits.

If any of the above conditions occur, take positive control and execute immediate corrective action to maximize and maintain boat handling capability. The safest method for the 41' UTB to take a heavy breaking sea is "bow-on," taking the pilothouse windows into consideration. Remember the full power maneuver at the last minute to lift the bow to prevent a full wave break over the pilothouse. If the boat takes a sea over the stern, filling the well deck, use extreme caution when maneuvering to come about. If the well deck is flooded, the boat will be sluggish and may not respond well when coming about.

#### NOTE &

Always be aware of the wind, waves, and currents. Watch for changes. The enclosed cabin creates a sense of isolation and security from the elements. The high superstructure also creates wind resistance that can seriously affect safe navigation and boat stability.



### **Towing in Heavy Weather**

#### E.16. General

The 41' UTB handles very well with a tow in open water, heavy weather conditions. Much of this stability results from the tow acting as a drogue. If suddenly separated from the tow, use extreme caution and avoid presenting the stern directly to the seas.

## E.17. Line handling

A serious station-keeping hazard exists when picking up or tending the towline off the stern. The wide, flat transom of the 41' UTB has a tendency to draw the towline under the transom when a heavy sea lifts the stern. Keep headway on and slack out of the towline. THIS IS A MUST AND CANNOT BE OVER-EMPHASIZED.

#### WARNING ®

Line handling during heavy weather can be very dangerous due to extra strain on the line. If the line around the tow bitt must be adjusted, use extreme caution to prevent it from a sudden surge or running free. When adjusting the towline, the crewmember must increase the distance between their hands and the tow bitt to prevent their hands from being pulled into the bitt. Jewelry shall never be worn when handling lines.



### **Ice Operations**

## E.18. Ice limitations

The 41' UTB is not designed for breaking ice. The resulting hull stress will shorten the life of the boat even if the hull is not penetrated. Operating in or near ice could also lead to clogging the sea chest.

## E.19. Operating in/near ice

#### NOTE &

Be sure the amount of recirculated water going to the sea chest does not cause the main engines to overheat. If operating in or near ice, crack open the valves in the recirculating line from the main engine heat riser and the valve at the sea chest. This will allow warm water to enter the sea chest reducing slush ice build up. Use raw water discharge from either main engine (both if necessary).

Watch the amount of raw water coolant discharge at the tail pipe to ensure adequate cooling of the stainless steel mufflers.

#### E.20. Speed

If you must enter an ice field, proceed very cautiously and never exceed 700 RPMs.

## E.21. Ice thickness

The boat can break ice up to 1" thick without much difficulty. The boat is slowed markedly by 2" ice and will be stopped dead in the water by field ice over 3" thick. Exercise extreme caution when operating in ice 4" thick. It can easily cause severe hull damage.



#### **Securing Procedures** Section F.

#### F.1. Procedures

Upon mooring after a mission, take the following steps, in the given order, to secure the boat properly and to prepare it for the next mission:

Procedure	
If recently run at high RPMs, allow the engines to idle 4 to 5 minutes for cool-down. An abrupt shutdown of hot engines produces severe internal metal stress. This cooling period is especially important with turbocharged engines.	
Secure all electrical and electronic equipment except for circuit #11 in the 12V DC circuit breaker.	
Secure all 24/28V DC panel circuit breakers except #11 and #12 for the main engine starts, #17 for the main engine alarms, #1, #16 and #25 for the blue light, horn, Halon alarm, and the bilge/fire alarm.	
Secure the main engines by pulling up on the engine fuel stop cables (T-Handles) at the steering console.	

#### **CAUTION!**

injectors into the cylinders causing a hydraulic lock of the main engine.

	5	Secure 24/28V DC panel circuit breakers #11, #12, and #17.		
	6	6 Secure the sea suction valves.		
	7	Remove all water, oil, and fuel from the bilges. Wipe them dry.		
	8 Wipe-down all machinery and remove the wipe-down cloths.			
	9	Make a visual check of all hoses, wires, belts and other items subject to wear.		
ıs	10	Stow all equipment in its proper place.		
it	11	Rinse all firefighting and dewatering equipment used during the mission with fresh water, then dry and stow it.		
	12	Connect the shore-tie cable to the boat. Energize the dockside circuit breaker first, then the main circuit breaker in the 110V AC circuit breaker panel.		
	13	Energize the circuit breakers for the battery charger and main engine heaters in the 110V AC circuit breaker panel.		

Sound each fuel tank and fill to 95 percent (231.5 gallons).

#### NOTE &

If the portable dewatering pump was used, replace it with the unit spare while it is being cleaned and serviced. Replacement of the pump will allow the boat to remain mission ready.

14



Step	Step Procedure	
15	Close all doors, hatches, and scuttles.	
16	Wash down the boat with fresh water.	

### NOTE &

The mission is not complete until the boat is ready for the next mission.



# Chapter 6 Mission Performance

### **Overview**

#### Introduction

The performance procedures in this chapter are specifically designed for 41' UTB missions and crew. For further information on any of the general procedures, review the Boat Crew Seamanship Manual, COMDTINST M16114.5 (series). In addition, repetitive underway training is essential to gain the practical judgmental skills and operational experience necessary to carry out the Coast Guard's multi-mission role.

#### In this chapter

Topic	See Page
Person in the Water Recovery (PIW)	6-2
Damage Control and Dewatering	6-4
Firefighting	6-10
Anchoring	6-14
Helicopter Operations	6-15
Towing	6-16



### Person in the Water Recovery (PIW)

#### A.1. General

Person in the Water situations are divided into two categories:

- Crew members Individuals from your boat, (reducing the size of your crew for response).
- Victims Other persons in the water, (allowing use of the full crew).

#### A.2. Key issues

Key issues in PIW retrieval include:

Feature	Description
Freeboard	The well deck is wide, with relatively low freeboard (39" sides). This is the preferred location for PIW retrieval.
Maneuvering	The boat's speed and ease of handling greatly assist in returning and maneuvering for pickup. Though not appropriate in all conditions, variation of the standard techniques might speed recovery. For instance, by splitting the shafts one ahead and one astern, the 41' UTB will turn in a tight circle to come back on the person in the water.

NOTE &

Because the well deck is aft, the person in the water will be in close proximity to the propellers during recovery. Minimize use of the shafts when alongside the person in the water.

#### **WARNING** ♥

Exercise extreme caution when making any accentuated turning maneuvers, such as a "split-shaft" PIW recovery. A full rudder course change with shafts opposed could eject an unwary crew member from the deck.

1	
Sail Area	With any amount of wind, the high superstructure and shallow draft will cause the boat's stern to turn into the wind with its bow pointed in the direction the wind is blowing (downwind). This condition could
	cause pickup problems when getting in close. Carefully assess how to compensate for wind, seas, current or any combination of them. PIW recovery
	should be with the bow into the wind and seas.



Crew Member Recovery	If an injured crew member is in the water, carefully assess the risk. Exercise extreme caution if necessary to use a swimmer. The normally assigned crew of three is <b>not</b> adequate to handle two crew members in the water with only the covergin on board.
	the water with only the coxswain on board.



### **Damage Control And Dewatering**

#### A.3. General

Damage control procedures provide stability and maintain watertight integrity. The Boat Crew Seamanship Manual, COMDTINST M16114.5 (series), covers general damage control, including watertight integrity and stability. Specific 41' UTB issues are addressed here. Damage control for crew members is divided into two categories:

- those actions required to maintain the boat, and
- those actions that might improve mission accomplishment on an assisted vessel.

#### A.4. Key factors

Key factors which improve operational abilities are listed below. Consider these before a damage control problem occurs.

## integrity

A.4.a. Watertight The 41' UTB has "one-compartment" stability. That is, if no more than any one compartment is flooded, the vessel should remain afloat. This assumes all other compartments are watertight with no progressive flooding. Note the limitations of each compartment with regard to preventing progressive flooding.

> The forepeak, lazarette, engine room, and fuel tanks can effectively be sealed off from the other compartments and the environment. Maintaining watertight integrity of these spaces is imperative. Worn hatch and scuttle gaskets, warped or bent hatches, scuttles and their locking mechanisms, and open stuffing tubes all compromise watertight integrity.

> While underway, all listed watertight closures and fittings must be secured. The 41' UTB has the following watertight fittings:

- Forward Bitt Cap
- Forepeak Scuttle
- **Engine Room Hatches**
- **Engine Room Scuttle**
- Lazarette Scuttle

Though not technically a watertight closure, the forward compartment escape hatch must remain closed while underway.



Damage to the stainless steel mufflers which pass through the lazarette could allow flooding from either exhaust cooling water or water entering the exhaust pipe from astern.

Without watertight integrity, compartment flooding will displace any air remaining in the compartment. This results in a loss of all buoyancy for that compartment. A single fitting, such as a loose forward-bitt cap, could easily be forced out by the pressure created by incoming water, allowing progressive flooding.

## A.4.b DC equipment

There is a damage control kit in the passenger compartment stowage area. The kit includes:

#### NOTE &

Note the location and quantity of other items on board that can be used to supplement damage control equipment, (e.g., pillows, blankets, fenders, tools, engine spares, lines, etc.).

- Various sizes of hose clamps
- Canvas, 4'x 4'sheet
- Rubber gasket material, 4'x 4'x 1/8" sheet
- Various sizes and number of wedges
- Various sizes and number of plugs
- Marline, 250' line
- Oakum
- Small ball of marlin
- Wooden mallet
- Hacksaw (with sheath) and spare blades

#### A.4.c. Dewatering pumps

This following information describes the equipment and uses for dewatering available aboard a 41' UTB.

Pump	Use
Fixed Fire Pump	The 41' UTB's fixed fire fighting system is comprised of the sea chest, Simplex/duplex firemain strainer, starboard engine with power take-off, fire pump, firemain riser and tri-gate. It provides firefighting capability, or when coupled with the portable eductor, a very effective dewatering capability (or combination of both).

#### **CAUTION!**

In the next two sections on dewatering and firefighting, use of the power take-off/fire pump will be discussed. REMEMBER: With the fire pump power take-off engaged, use of the starboard engine for maneuvering is limited. Never exceed a maximum of 1000 RPM. Engine speed above 1000 RPM could break or throw the power take-off/fire pump drive belt, causing loss of pump pressure for either fire fighting or dewatering.



Dewatering Pump Kit	Either the standard CG-P1B or the optional CG-P5 pump can be used for dewatering. Additional information on the pump kit can be found in Chapter 3, Section E.3. of this manual and the Rescue and Survival Systems Manual.
Installed Bilge Pump System	This system is described in Chapter 3, Section E.1. of this manual.

#### A.4.d. Eductor

The first step is to set up the eductor. Follow these steps, in order, to accomplish this task:

#### Step One

	Procedure		
1	Close all firemain riser tri-gate discharge ball valve outlets (main deck).		
2	Connect a 1 ½" fire hose to one of the secured 1 ½" outlets on the firemain riser tri-gate. (Use either a 25' or 50' length based on need.)		
3	Connect the other end of the 1 ½" hose to the high pressure/inlet side of the eductor.		
4	Connect a 2 ½" fire hose to the low pressure/discharge side of the eductor.		
5	Submerge the eductor in the flooded area. Use the removable suction strainer to keep debris out of the eductor.		
6	Control the discharge end of the 2 ½" hose to prevent accidental flooding. Lead the discharge end overboard so water does not discharge onto either vessel.		

<u>The second step</u> is to set-up the fixed fire pump. To accomplish this, follow these steps, in order:

#### Step Two

	Procedure		
1	Inspect, clean and align the simplex/duplex firemain strainer.		
2	Open the sea chest firemain butterfly valve.		
3 Place the starboard engine in neutral.			
4	Remove the power take-off handle retainer strap.		
5	Use an open palm and push the power take-off handle forward (toward the bow) to the engaged position.		



With pressure indicated on the firemain pressure gauge in the pilothouse, operate the eductor (number 3 below).

If the fixed fire pump fails to operate after one minute, follow these steps:

		Procedure
WARNING 💖	1	Make sure the starboard engine is in neutral and at idle speed.
Use extreme caution disengaging the power take-off/fire pump. The lever "arc	2	Disengage the power take-off/fire pump using the open palm to push firmly back (toward the stern) on the power take-off handle/lever.
of throw" can jam the	3	Advise the coxswain before taking further action.
fingers between the lever handle and the riser pipe, causing injury.	4	Visually inspect the power take-off/fire pump belt. Make sure it is properly installed on the pulleys and not damaged.
WARNING ®		ce hands in the vicinity of the power take-off/fire pump belt when the ngine is running.
	5	Make sure the sea chest butterfly valve is open.
	6	Make sure the simplex/duplex strainer is clean, aligned, and tightened securely (no air leaks).
	7	With the sea chest butterfly valve open, the simplex/duplex strainer clean, aligned, and tight, and the tri-gate ball valve closed, loosen the air vent plug on top the fire pump so air escapes from the pump casing (bleeding the pump).
	8	When no further air escapes from the air vent plug hole, tighten the vent plug.
		voin prug.

pump, then use the procedures listed above.

manually with water.

<u>The third step</u> is operating the eductor. With the eductor installed, fixed firemain system aligned, power take-off engaged, and pressure indicated on the firemain pressure gauge:

Advise the coxswain and request to engage the power take-off/fire

If the fire pump fails to pump after bleeding, prime the pump

Continue this procedure until the air blockage is eliminated.

#### **Step Three**

9

10

11

	Procedure
1	Open the tri-gate ball valve providing high pressure firemain water
	to the 1 ½" eductor supply hose.



2	Make sure that discharge at the end of the 2 ½" low pressure discharge hose occurs almost immediately after opening tri-gate ball valve.	
3	If maneuvering is not required, disengage the starboard marine gear. Grasp the starboard throttle lever at the base (thumb-finger indents) and pull fully out. This allows throttle use (change in engine speed) without shaft RPM.	
4	Increase starboard engine RPM to bring firemain pressure (at gauge) to 100 psi. Do not exceed 1000 RPMs.	
5	Check all hoses frequently for kinks or anything that will cause back pressure. Discharge hose back pressure or reduction/loss of firemain pressure will decrease eductor output.	

## A.5. Assisting a boat

In the course of many SAR missions, the 41' UTB and crew are frequently called on to provide varying levels of damage control.

The key to keeping a boat afloat is to attack the cause of the problem (i.e., broken hose, hole, etc.) and not the symptom (flooding). Dewatering may be necessary to determine the scope of the problem, but dewatering alone will not solve the problem. As with damage control and dewatering the 41' UTB, the same items must be considered prior to assisting another vessel.

### NOTE &

Chapter 3 of the Coast Guard Addendum to the National SAR Manual, COMDTINST M16130.2 (series), states the Coast Guard's policy on Maritime SAR Assistance.

#### **CAUTION!**

Damage control risk assessment must be done prior to getting underway and repeatedly updated throughout the mission. Risk assessment must first evaluate, then continue to evaluate throughout the mission, the potential for personnel injury. All crewmembers must be aware of the capabilities of the boat, the individual crew members, and the equipment on board. If additional equipment or crew might be necessary for a specific mission, it should be brought aboard before leaving the dock.

## A.5.a. Watertight integrity

The standard 41' UTB boat outfit does not have sufficient equipment to conduct extensive watertight integrity control measures.

If necessary to tie up alongside a vessel in need of damage control assistance, ensure maximum watertight integrity is maintained on board the 41' UTB. Determine, to the best extent possible, the assisted vessel's layout and source of problem.



## A.5.b. DC equipment

As discussed in Section 6.A.4.b., the 41' UTB damage control kit and other gear is readily available.

In performing the risk assessment mentioned in the caution box above, attempt to determine before leaving the dock whether any additional damage control equipment might be required. Additional gear can easily be carried on the 41' UTB's ample main deck and well deck space.

#### A.5.c. Pumps

The following information describes the capabilities of the 41' UTB to dewater vessels.

#### NOTE &

With the fire pump power take-off engaged, use of the starboard engine for maneuvering is limited to a maximum of 1000 RPM.

	Pump	Use
	Fixed Fire Pump	While alongside an assisted vessel, the 41' UTB's fixed fire pump/main system and eductor will provide an effective dewatering capability. It is described in Sections 6.A.4.c. and 6.A.4.d. above.
		Use of the fire pump power take-off limits starboard shaft maneuvering capability. Keep this in mind when deciding whether to make-up the assisted vessel to the 41' UTB. Assess all risk to both the 41' UTB and the assisted vessel. Pay particular attention to the proximity of navigational hazards and how both vessels react in the prevailing weather conditions.
	Dewatering Pump Kits	Either the CG-P1B or CG-P5 pump can provide dewatering capability to an assisted vessel. Though each pump has instructions inside its container further assistance or direction might be necessary to dewater the assisted vessel. Assess all risks prior to putting a crew member on the assisted vessel.



### **Firefighting**

#### A.6. General

#### WARNING 💖

The 41' UTB boat outfit has no personal protective gear approved for firefighting.

The 41' UTB carries firefighting equipment primarily for use on board, and in those extreme cases where firefighting may save other lives. Coast Guard policy for firefighting is in Chapter 8, Volume VI of the Marine Safety Manual, COMDTINST M16000.11 (series).

In any firefighting situation, proper risk assessment is paramount. The available firefighting equipment aboard the 41' UTB, the training and small size of the crew, and availability of personal protective gear must all be considered in the risk assessment and may limit response.

As with damage control and dewatering, firefighting for 41' UTB crew members is divided into two categories:

- Firefighting on the 41' UTB, and
- Assisting distressed vessels with firefighting.

NOTE &

Persons before property. Remove or rescue any personnel (including persons in the water) and evaluate their condition. If injuries require more than minor first aid, evacuate them before any additional firefighting. Do not hazard victims by keeping them aboard the 41' UTB in non life threatening firefighting situations.

# A.7. Firefighting protection

Firefighting is very difficult, challenging, and hazardous. Once a fire begins, knowledge of on board equipment, firefighting capabilities and techniques is the main defense. The crew should be completely familiar with all 41' UTB firefighting capabilities. They include the following.

#### A.7.a. Halon 1301

This fixed system is for engine room fires only. The components of this system are described in Chapter 3, Section F, Fixed Fire Extinguishing Systems. The system operation is described here.

If engine room temperature exceeds 190° F, sensor contacts will close and sound the pilothouse alarm horn. If the alarm horn sounds, inspect the engine room through the viewing window at Bulkhead 6 to determine why the alarm is sounding before activating the system or entering the engine room. A CO<sub>2</sub> extinguisher may be able to extinguish a small engine room fire. In a severe engine room fire, activate the Halon 1301 system.

To activate the system follow these steps (on the following page):



Step	p Procedure		
1 Stop engines. (engines must be completely stopped)			
2	Clear engine room of all personnel.		
3	Close main deck engine room hatches and scuttle.		
4	Pull emergency fuel cut-off "T" handles.		
5	Actuate Halon flow by pulling release handle immediately above Halon bottle, forward side of Bulkhead 6.		
6	Keep engine room closed for at least 5 minutes.		
7	After 5 minutes, let engine room vent for 15 minutes.		

## A.7.b. Portable fire extinguishers

There are three portable fire extinguishers aboard:

Туре	Location
10 lb. PKP	Passenger compartment pilothouse support stanchion
10 lb. PKP	Pilothouse, inboard of door, aft bulkhead
5 lb. CO <sub>2</sub>	Passenger compartment, aft side of gun locker

A dry chemical (PKP) extinguisher does not cool or remove oxygen from the fire triangle. It is effective **only** in knocking down flames. If enough heat or an ignition source is present, the fire will reflash after the powder settles from the air. Class A fires are particularly prone to reflash. PKP extinguishers are least effective on Class A fires.

### WARNING \*

 ${\rm CO_2}$  allows the same reflash hazard as does PKP. Cool all hot spots thoroughly to prevent reignition. Note that  ${\rm CO_2}$  is very poor as a Class B extinguishing agent.

## A.7.c. Firemain system

The fixed fire pump and installed firemain system is described in Section 3.C. of this manual.

The following firefighting equipment is stowed in the passenger compartment stowage area:

- One 1 ½" x 25' firefighting hose
- One 1 ½" x 50' firefighting hose
- One 2 ½" x 12' firefighting hose
- One 2 ½" x 30' fire monitor connector hose
- One 1 ½" Vari-nozzle



The following firefighting equipment is stowed in forepeak:

• One 2 ½" Stang fire monitor with nozzle

## A.7.d. Operating instructions

The following are operating instructions for the firemain system with hose for fire fighting. The first step is preparation.

#### Step One

	Procedure
1	Connect a 1 ½" fire hose to the tri-gate.
2	Attach the Vari-nozzle to the other end of the hose. Make sure the nozzle is closed.
3	Lay out the hose and make sure there are no sharp bends or kinks to restrict water flow.
4	Signal the nozzleman and engineer to make ready to start the fire pump.

The second step is setting up the fixed fire pump.

#### Step Two

	Procedure		
1	Inspect, clean and align the simplex/duplex firemain strainer.		
2 Open the sea chest firemain butterfly valve.			
3 Place the starboard engine in neutral			
4	4 Make sure the firemain riser tri-gate ball valves are closed.		
5	Remove the power take-off handle retainer strap.		
Using an open palm, push the power take-off handle forward the bow) to the engaged position.			
7	With pressure indicated on the firemain pressure gauge in the pilothouse, and only upon the coxswain's command, open the trigate ball valve, providing water to the hose.		

The third step is applying firefighting water.

### **Step Three**

	Procedure
1	Do not exceed the 1000 RPM limitation (as noted under dewatering). If maneuvering is not necessary, disengage the starboard marine reduction gear.
2	Check all hoses frequently for kinks or anything that will restrict the flow of water.



	3	If the fire pump fails to provide water, check the steps listed above (See Section 6.A.4.d.).	
A.7.e. Dewatering pumps	The CG-P1B pump is of little use for firefighting. The optional CG-P5 pump can provide minimal firefighting capability, provided the pump-compatible, quick-release fitting fire hose and nozzle is carried.		
A.8. Assisting a boat	cannot developi	be over-stressed. Continually look at worst-case scenarios ing, and determine whether the 41' UTB is the proper and adequate to handle the mission.	
A.8.a. Portable fire extinguishers	The portable fire extinguishers mentioned in Section 6.A.7.b. above will provide a "first aid" type firefighting capability. A properly used 10 lb. CO extinguisher can be very effective on small Class C fires.		
A.8.b. Firemain system	The fixed fire pump and installed firemain system is described in Section 3.C. of this manual.		
A.8.c. Dewatering pumps	If time permits when responding to a fire, bring an optional CG-P5 its pump-compatible, quick-release fitting fire hose and nozzle. provide additional fire fighting capability.		



### **Anchoring**

#### A.9. General

Due to the nature of the 41' UTB's work, it may encounter situations where it must take station and standby for periods of time. Rather than keeping station, it is less fatiguing and more economical to anchor. The circumstances will dictate if and where to anchor. The 41' UTB is equipped with 300 feet of 2 ¾" DBN, 9' of galvanized BBB chafe chain, and a 22 or 25-pound Danforth anchor. A second Danforth anchor is stored in the forepeak.

## A.10. Site selection

If weather, seas, bar conditions, fatigue, or other factors necessitate anchoring the 41' UTB and an assisted vessel, consider the anchorage carefully. Anchorage site selection is more than finding deep water. Select the anchorage site carefully, based on present conditions and those projected (winds/weather, tide, current, etc.).



### **Helicopter Operations**

#### A.11. General

Helicopter operations are of two types:

- delivery of equipment or personnel to the 41' UTB and/or
- pickup of personnel or material from the 41' UTB.

For both types of helicopter operations, ensure adequate maneuvering space for the hoist, properly prepare the boat for the hoist, and adequately brief the crew members on the procedures and safety precautions. In the case of a personnel hoist, brief the individual to be hoisted. The 41' UTB's well deck provides a good working area. Close all sliding windows and door to prevent rotor wash spray from entering the pilothouse.

More detailed procedure for helo operations can be found in Chapter 19 of the Boat Crew Seamanship Manual, COMDTINST M16114.5 (series).



### **Towing**

## A.12. Towing limitations

Towing limitations for the 41' UTB are set at 100 gross tons (i.e., vessels of approximately 80 feet in length). These parameters are general. Every case will require the coxswain to determine if a tow can be completed in a safe manner. In less than favorable conditions, it may not be possible for the 41' UTB to tow vessels of 100 gross tons.

#### **WARNING**

These limits may be exceeded with approval of the operational commander, only after making appropriate risk assessment for the situation at hand. Consider on-scene conditions noted by the 41' UTB coxswain in the risk assessment process. The coxswain retains the final on-scene decision as to whether an action may or may not be safely executed.



# Chapter 7 Emergency Procedures/Casualty Control

### **Overview**

#### Introduction

This chapter describes emergency procedures and actions to be taken if a casualty to the boat or one of the boat's systems occurs.

The best casualty control action is to prevent casualties through good maintenance and proper seamanship. If a casualty does occur, there must be timely execution of a predetermined plan of action to correct and/or prevent worsening of the situation. Frequent underway casualty control drills both prepare and improve the crew's response.

### NOTE &

Make frequent reference to the other sections of this handbook while reviewing emergency procedures and casualty control. Become fully familiar with emergency procedures and review them often. An actual emergency is not the time to learn emergency procedures.

### In this chapter

Section	Title	See Page
A	Capsizing	7-3
В	Casualty Control	7-5





### Section A. Capsizing

#### A.1. General

Capsizing is the most demanding situation the crew of a 41' UTB could experience. Capsize prevention is discussed in Section 5.E.11. of this handbook. Also refer to the Boat Crew Seamanship Manual, COMDTINST M16114.5 (series). Preparation, both physical and mental, increases chances for survival during a capsizing. The first step in preparation is to have a plan of action. This starts with extensive discussion and training, on the boat, as well as in the classroom. Second, be thoroughly familiar with the equipment and physical layout of the boat.

### A.2. Egress

Specific changes have been made in the 41' UTB as a result of past casualties.

#### These include:

### WARNING \*

In a capsizing, staying inside the hull is the least desirable option. There is a limited, undetermined amount of time for positive action. Make every effort to escape. Any air pocket in the hull will eventually be lost, leaving personnel trapped.

Item	Change
Handrails	To guide survivors, the handrail on the port side of the pilothouse extends down into the passenger compartment. This handrail leads from the overhead of the passenger compartment aft along the port side past the port sliding window and ends at the pilothouse door.
Sliding Windows	The sliding windows, installed on the port and starboard sides and the aft pilothouse bulkhead, offer additional escape routes. Note the side windows have one stationary panel. The forward panel slides aft. The outboard (starboard side) panel of the pilothouse aft bulkhead is stationary. To open the second panel, slide the panel outboard (to starboard).
Emergency Escape Hatch	A hatch in the passenger compartment cabin overhead serves as an additional escape route. The hatch is located directly above the porta-potti in the passenger compartment head.

### WARNING 💖

The escape hatch in the head **must** remain unobstructed and accessible at all times. Do not install any obstruction nor store any equipment in the head unless it is specifically designated by this manual.



# A.3. Recommended methods of egress

Provided all compartments remain watertight at the time of capsizing, the recommended methods of egress from a capsized 41'UTB are:

Emergency Escape Hatch	The bow section will most likely retain the most buoyancy in event of a capsize.
Pilothouse Port Side Sliding Window (forward panel slides aft)	There are less obstructions around this window than all others.
Pilothouse Starboard Side Sliding Window (forward panel slides aft)	
Pilothouse Rear Bulkhead Sliding Window	
Pilothouse Door	This method of egress is least recommended as the door must open outward, against the water pressure and surge. Also, once open, the doorway could allow a significant, uncontrollable increase in flooding.



### Section B. Casualty Control

### Overview

#### Introduction

Casualty control is the positive action taken to correct, control, and/or combat operational discrepancies experienced during underway operations. Due to the nature of Coast Guard missions, corrective casualty control measures can affect a range of operational situations from the potential loss of life to minor hull or machinery damage.

#### In this section

Торіс	See Page
Fire	7-6
Main Engine Runaway	7-7
Loss of Main Engine Lube Oil Pressure	7-8
Main Engine High Water Temperature	7-9
Shaft Stuffing Box/ Packing Gland Overheating	7-10
Collision with a Submerged Object/ Running Aground	7-11
Loss of Steering	7-12
Main Engines Fail to Start	7-15
Reduction Gear Failure	7-16
Main Engine/Marine Gear Failure	7-17



### **Fire**

#### **B.1.** General

This type of casualty presents the most common threat to operations. The most logical and best preventative action is to remain alert and take early corrective action when fire-threatening conditions are observed. Evaluate every fire or potential fire and take corrective action. Firefighting is covered in Section 6.A.6. of this handbook.

### B.2. Engine room fire

### WARNING 💖

If at any point there is doubt as to the ability to control and extinguish an engine room fire, or if it is determined to be beyond the capability of the portable fire extinguishers, use the installed fixed Halon 1301 Fire Extinguishing System.

The most likely location of fire on the 41' UTB is the engine room. Therefore, a timely physical inspection of this space and its equipment is critical. If an engine room fire is suspected, conduct the initial investigation through the viewing window in Bulkhead 6. If a fire or the potential for fire is present, the severity of the situation will dictate the course of action. In any event, take positive, aggressive action immediately to correct the situation.

The fixed Halon 1301 Fire Extinguishing System has the capacity to extinguish an engine room fire provided the instructions for its use are followed carefully. All crew members must be thoroughly familiar with the operating instructions. (See Section 3.F. for system description and Section 6.A.7. for system operation.)

#### **B.3.** Other fires

Proper use of fire extinguishers can quickly extinguish small Class B and Class C fires.

### WARNING 💖

If an electrical fire occurs, first secure the appropriate breaker(s) to the effected piece of equipment. If necessary, secure the main breaker.

#### NOTE &

Consult the Boat Crew Qualification and Certification Manual, Volume IV. Boat Engineer, COMDTINST M16114.6 (series), or Technical Pub 4368 (41' UTB Service Manual) for additional information concerning the following engineering, hull, or mechanical casualties.



### **Main Engine Runaway**

### **B.4.** Procedure

If there is a main engine runaway casualty during normal operation, immediately take the following corrective actions:

Step	Procedure
1	Try to reduce the affected main engine's RPM by bringing both main engines back to the "clutch engaged" position, keeping a load on the affected engine.
2	If the main engine continues to runaway, pull the main engine fuel stop cable for the affected engine.
3	If after pulling the fuel stop cables the main engine continues to runaway, place the <b>unaffected</b> main engine in the neutral position and turn in the direction of the runaway engine to increase the shaft load.



### Loss of Main Engine Lube Oil Pressure

#### **B.5.** Procedure

A main engine lube oil pressure loss will activate the alarm (bell) system and energize the red indicator light (located below the affected main engine lube oil pressure gauge). If this occurs, immediately take the following corrective actions:

Step	Procedure
1	Reduce RPM's to clutch ahead on both engines.
2	Identify affected engine.
3	Notify crew of casualty.
4	Secure affected engine.
5	Check engine room through lower cabin view port to assess the situation.
6	Rig the anchor, if necessary.
7	Engineer: Enter engine room,
	Crewmember: Act as safety observer for Engineer.
8	Ensure fire extinguishers are on scene.
9	Check bilge area for lube oil.
10	Check lube oil for quality and quantity.
11	Notify station of situation.
12	Return to station if cause cannot be determined or repaired.



### **Main Engine High Water Temperature**

#### **B.6.** Procedure

If main engine jacket water coolant reaches 205°F, it will activate the alarm (bell) system and energize an amber indicator light (located below the affected main engine jacket water temperature gauge). If this occurs, immediately take the following corrective actions:

Step	Procedure
1	Reduce RPM's to clutch ahead on both engines.
2	Identify affected engine.
3	Notify crew of casualty.
4	If temperature continues to rise, secure engine.
	engine is secured and the fuel stop is in the up position, to prevent seizure agine cools, periodically rotate the engine with the starter.
5	Check overboard discharge.
6	Engineer: Check engine room through lower cahin view port

### CAUTION!

### **CAUTION!**

ntil the e	ngine cools, periodically rotate the engine with the starter.
5	Check overboard discharge.
6	Engineer: Check engine room through lower cabin view port to assess the situation.
7	Crew member: If necessary, rig the anchor.
8	Engineer: Enter engine room.
	Crew member: Act as safety observer for engineer.
9	Ensure sea suction valves are open.
10	Check sea strainers. If necessary, shift strainers.
11	Check bilges.
12	Check cooling lines.
13	Check raw water pump with back of hand.
14	Check expansion tank after engine has cooled.
15	Notify station of situation.



### **Shaft Stuffing Box/Packing Gland Overheating**

### B.7. Warning signs

If there is no water coming from the shaft packing gland (6 to 10 drops per minute) and the stuffing box gland is too hot to touch, immediately take the following corrective actions.

### WARNING 💖

Do not place a hand near the turning shaft until you bring that shaft to clutch speed. Always exercise caution when working around a turning shaft.

#### **B.8.** Procedure

Follow these corrective actions.

Step	Procedure
1	Bring both main engine throttle control handles to the clutch position. Do not disengage the shafts or secure the main engines.
2	Cool down the shaft and packing gland with raw water.
3	Loosen the packing gland nut.



### Collision With a Submerged Object/Running Aground

#### **B.9.** Procedure

If the boat strikes an object in the water or runs aground, immediately take the following corrective actions:

Step	Procedure
1	Reduce RPM's to neutral on both engines.
2	Notify crew of casualty.
3	Coxswain: Verify position.
4	Engineer: Proceed to the engine room to check for compartment flooding.
5	Crewman: Check all other compartments for flooding.
6	Engage engines at various speeds to check for vibration.
7	Notify station of situation.

### **CAUTION!**

Excessive shaft or propeller vibration may further damage the strut or stern tube bearings.



### **Loss of Steering**

### **B.10.** Signs

### **CAUTION!**

Avoid backing on either shaft until the cause of the steering loss is determined and the proper actions are taken. If there is a loss of steering control while underway, bring the 41' UTB to dead in the water (at most, maintain bare steerageway). Then investigate to determine the cause. Likely causes of steering loss include:

- broken steering cable,
- broken hydraulic hose(s),
- jammed rudder, or
- helm or helm pump failure.

If the helm turns freely without any effect on the rudders, suspect a broken hydraulic hose, air in the system, or leaking fitting. If the helm will not turn, suspect a jammed rudder.

### B.11. Steering hose broken

To regain control if a hydraulic hose is broken, follow these steps.

Step	Procedure
1	Bring both main engine throttle controls to the neutral or minimum steerage clutch position if in a running sea. Try to put the seas on the bow.
2	Notify crew of casualty.
3	Coxswain: Steer with engines, if needed.
4	Engineer: Investigate the casualty.
5	Crew man: If necessary, rig the anchor.
6	Crew man: Remove emergency tiller from the lazarette.
7	Place engines in neutral.
8	Carefully mount the emergency tiller on the port rudder post.
9	Gain control of the rudders using the emergency tiller.
10	Detach release pin on starboard rudder post to disconnect steering cable. Tie cable/hydraulic ram out of way.
11	Test rudders for complete range of motion (full port to full STBD)
12	Bring the tiller arm about until the rudder arm position indicates the rudders are amidship.



Step	Procedure
13	Engage each shaft separately to reduce propeller thrust on the rudder blades and emergency tiller.
14	Keep the main engine RPM at a minimum to reduce strain on the crew tending the emergency tiller.
15	The coxswain shall give standard steering commands to the crew members tending the rudder.
16	Notify station of situation.

### B.12. Jammed rudder

To regain control with a jammed rudder, follow these steps.

Step	Procedure			
1	Reduce RPM's on both engines. Bring both main engine throttle controls to the neutral or minimum steerage clutch position if in a running sea. Try to put the seas on the bow.			
2	Notify crew of casualty.			
3	Coxswain: Steer with engines, if needed.			
4	Engineer: Investigate the casualty.			
5	Crew man: If necessary, rig the anchor.			
6	Crew man: Remove emergency tiller from the lazarette.			
7	Place engines in neutral.			
8	Carefully install emergency tiller, mounting it on the <b>port</b> rudder post. Maintain positive control.			
9	Engineer: If necessary, carefully remove the tie rod bar connecting the port and starboard rudder posts.			
10	Use caution while exercising each rudder to determine which rudder is jammed. Determine the cause, if possible (i.e., debris, damage, etc.).			

### NOTE &

If the port rudder is jammed, lash the emergency tiller/ rudder arm with mooring lines to the stern cleats to prevent movement. If the starboard rudder is jammed, keep the ram attached to prevent movement.

If unable to free the jammed rudder (using attempts to rack it back and forth with the emergency tiller or by clearing any debris), secure it, as possible, to prevent movement.



Step	Procedure			
12	After securing the jammed rudder, adjust the opposite rudder to gain the greatest steerage. Use main engines, throttles shafts, and propellers, to regain and maintain steerage.			
Keep main engine RPM at a minimum to reduce stress or tending the emergency tiller.				
14	The coxswain shall give standard steering commands to the crewmembers tending the rudder.			

### **CAUTION!**

The starboard rudder does not have rudder stops. Exercise extreme caution when removing the tie rod bar from either rudder arm. Removing the tie rod bar could allow the starboard rudder blade to turn into the starboard propeller.

### **WARNING**

To prevent injury, man the emergency tiller at all times while it is installed on a rudder post. However, avoid tending the emergency tiller by hand when backing down. Backing down produces a heavy surge on the rudder. This surge can throw the tiller arm and severely injure the operator. If sternway is necessary, consider lashing the tiller amidships with mooring lines to the stern cleats to prevent movement. If not possible, remove the emergency tiller from the rudder post before backing down.

15	Notify station of situation.



### Main Engines Fail to Start

#### **B.13.** General

If the main engines will not turn over when the starter button is depressed or they turn over but will not start, refer to Chapter 5, Section C, Pre-Start and Start-Up Procedures, and the engine service manual.



### **Reduction Gear Failure**

B.14. Procedure If the marine gear fails to engage or operate properly, immediately take the following corrective actions:

Step	Procedure			
1	Bring both main engine throttle controls to the neutral position.			
2	Check the marine gear drive oil pressure gauge for the affected side. If the marine gear drive oil pressure gauge reads zero when the marine gear is in the neutral position, secure the respective main engine <b>immediately</b> .			
3	The MG-509 marine gear is equipped with a "come-home" feature that allows manual engagement of the forward clutch pack for emergency use only. The "come-home" feature for the port main engine/marine gear cannot be utilized due to the method of hookup.			
4	To engage the "come-home" feature, remove the two "come-home" access plugs from the manifold over the forward clutch location (aft side of marine gear). Use a screwdriver and alternately tighten the "come-home" set screws in a clockwise direction until clutch lock-up is attained. (See Technical Pub 4368 (41' UTB Service Manual) for a detailed diagram.)			

### WARNING 💖

The use of the "come-home" feature in the MG-509 marine gear requires that the starboard main engine be secured before the "come-home" feature can be engaged or disengaged.



### Main Engine/Marine Gear Failure

### B.15. Procedure

In the event of a main engine or marine gear failure, the MG-509 unit does not require securing the shaft, provided the following appropriate actions are taken:

### Main Engine Operable

Step	Action			
1	With the drive oil level at the full mark on the dipstick.			
2	Start and run the main engine in the neutral clutch position for a ninimum of 5 minutes.			
3	Marine gear drive oil pressure must remain at the normal operating pressure during this 5-minute period.			
4	This must be done after every 8 hours of free spinning operation.			

### Main Engine

### Not Operable

Step	Action
1	Complete these steps before operating the marine gear using the free spin feature.
2	Plug the dipstick tube and fill the marine gear completely with oil.
3	Drain the excess oil from the marine gear until it again reaches the full mark on the dipstick, after which free spin operation is allowed.
4	This must be done after every 8 hours of free spinning operation.

### Main Engine and/or Marine Gear Disabled

Step	Procedure
1	Lock the shaft, although there is no standard shaft locking device.

### WARNING \*

You must take extreme care not to cause personnel injury or damage to the boat.

### **CAUTION!**

Do not use wrenches, pry bars, etc. to keep a propeller shaft from rotating. These devices can slip or disengage causing personnel injury, puncture the hull, or damage the machinery. See Mechanical Emergency "Come-Home" feature or "Free-Wheeling" feature above.

### Chapter 7 – Emergency Procedures/ Casualty Control





# Appendix A 41' UTB Outfit List And Stowage Plan

### **Overview**

#### Introduction

This appendix is the standard stowage plan for the 41' UTB outfit. No deviation from this list is authorized, except in the event that the addition of portable equipment, not part of the standard boat outfit, is necessary to meet local mission needs; units are authorized to temporarily carry this extra equipment.

This authorization is on case by case basis only, and care must be taken to properly secure any extra gear and to ensure it does not interfere with safe egress or the boat's standard outfit/systems. Under no circumstances shall permanent alterations be made to power, stow or in any way accommodate extra equipment.

### In this appendix

This appendix lists the quantity and location of items for the following compartments of the 41' UTB:

Title	See Page
Forepeak	A-3
Main deck	A-3
Well deck	A-4
Lazarette	A-4
Passenger compartment	A-4
Pilothouse	A-7

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F	FOREPEAK			
OUTFIT ITEM	QTY	LOCATION		
Danforth anchor, 22 or 25 lb. galvanized	1 Each	On Bulkhead #2		
Anchor line, (2-¾" DBN)	300'	On stowage shelf		
Thimble, galvanized, (¾")	1 Each	Spliced in eye of anchor line		
Shackle, screw pin, (5/8")	1 Each	Attached to anchor line eye		
Swivel, galvanized, (1/2" galvanized)	1 Each	Attached to shackle on anchor line		
Anchor chafe chain, (1/2" galvanized)	9'	Attached to swivel on anchor line		
Shackle, screw pin, (7/16")	1 Each	Attached to chafe chain, hangs from fwd bitt plug		
Portable fire monitor	1 Each	In bracket, port side		
Fire monitor mounting stanchion	. 1 Each	In bracket, starboard side		

MAIN DECK			
OUTFIT ITEM	QTY	LOCATION	
Danforth anchor, (22 or 25 lb. galvanized)	1 Each	In brackets on passenger compartment (exterior)	
Wooden handle boat hooks	2 Each	Hanging by leather straps from pilothouse side handrails, P/S	
Life ring, 24" diameter, w/ 75' of 5/16" polypropylene line	1 Each	Port main deck handrail	
Float light w/attachment line	1 Each	Port main deck handrail	
Life raft, in canister, w/weak link, 4 or 6 person	1 Each	On shelf, pilothouse aft, starboard side (exterior)	
EPIRB	Optional	In bracket, pilothouse port bulkhead, aft of window	
Firemain tri-gate	1 Each	Mounted on riser	
Spanner wrenches	1 Set Optional	Mounted starboard side aft pilothouse bulkhead	



	WELL DEC	K
OUTFIT ITEM	QTY	LOCATION
Dewatering pump (P-1/P-5)	1 Kit	In brackets starboard side
Towline (2-3/4"dbn) w/cover	600'	On tow reel
Safety gas can (5 gallon)	1 Each	In bracket, port side
Fuel sounding rod	2 Each	Under gunwale, port/STBD side
Heaving lines (75')	2 Each	Port deck storage box
Rescue heaving line (75')	1 Each	Port deck storage box
Skiff hook	1 Each	Port deck storage box
Shackles, various, spare	4 Each	Port deck storage box
Chafing gear	As Required	Starboard deck storage box
Lead line	1 Each	Starboard deck storage box
Shackle, screw pin, 3/4"	1 Each	Starboard deck storage box
T-handle wrench, large	1 Each	Starboard deck storage box
T-handle wrench, small	1 Each	Starboard deck storage box
	LAZARETT	E
OUTFIT ITEM	QTY	LOCATION
Emergency tiller	1 Each	In bracket
PASSEN	GER COMPA	ARTMENT
OUTFIT ITEM	QTY	LOCATION
Porta-potti	1 Each	In head space
Toilet paper holder	1 Each	In head space
Swimmer's harness, w/100' line	1 Each	Under port berth seat
Helmets, goggles and gloves	3 Sets	Under port berth seat
Swim mask	1 Each	Under port berth seat
Swim fins	1 Pair	Under port berth seat
Pillows (covered)	2 Each	Under port berth seat



PASSENGER COMPARTMENT			
OUTFIT ITEM		QTY	LOCATION
Wool blankets (covered)		4 Each	Under port berth seat
Grapnel hook, 4 lb. (w/100', 2" DE	RN)	1 Each	Under port berth seat
Fire hoses:	21.1)	1 234011	onder port our ar out
1-½" x 50'		1 Each	Storage area
1-½" x 25'		1 Each	Storage area
2-½" x 12'		l Each	Storage area
2-½" x 30'		1 Each	Storage area
Vari-nozzle		1 Each	Storage area
Eductor		1 Each	Storage area
Engineering spare parts kit:			
Fuel filters, Racor 2040TM		2 Each	Under Port berth seat
Oil filter, Fleetguard LF3363		1 Each	Under Port berth seat
Belts, alternator, matched set		1 Set	Under Port berth seat
Belt, fire pump drive		1 Each	Under Port berth seat
Light Bulbs, navigational & interior		As Required	Under Port berth seat
Electrical equipment fuses		As Required	Under Port berth seat
Salt water pump impeller w/ga	sket	1 Each	Under Port berth seat
Tool box (for underway repairs)		1 Kit	Storage area
Damage control kit		1 Kit	Storage area
Oil can, 5 gallon (stencil oil grade	on can)	1 Each	Storage area
EMT kit		Optional	Storage area
Oxygen kit (if EMT kit on board)		Optional	Storage area
			390 Aeromedical pack is the only a carried on board, the EMT kit is
Shoulder line throwing gun (SLTG)		Optional	Gun locker
M-16 SLTG conversion kit		Optional	Gun locker



PASSENGER COMPARTMENT			
OUTFIT ITEM	QTY	LOCATION	
Hand-held search light (portable)	1 Each	Storage area	
Personal floatation devices:			
CG Type I w/PML and whistle	4 Adult	Under STBD berth seat	
CG Type I w/PML and whistle	2 Child	Under STBD berth seat	
Personal survival vests	5 Each	Gun locker	
Stokes litter w/floatation, ballast bar & chest pad	1 Each	Above STBD berth seat	
Pyrotechnics kits:			
MK-79 signal kit	2 Kits	Gun locker	
MK-124 day/night flare	12 Each	Gun locker	
MK-127A illumination flare	As Required	Gun locker	
10-Person first aid kit	1 Each	Above gun locker	
Safety grounding wand	1 Each	Storage area	
Trash can, 5 gallon	1 Each	Storage area	
Fenders:			
8" x 30", cylindrical (white)	4 Each	Storage area	
60" circ., (optional), (orange)	2 Each	Storage area	
Mooring lines:			
2¾" DBN x 30'	2 Each	Storage area	
2¾" DBN x 60'	2 Each	Storage area	
Bridles	No More Than 150'	Storage area	
Fire extinguishers:			
10 lb. PKP	1 Each	On pilothouse support stanchion	
5 lb. CO <sub>2</sub>	1 Each	Aft side/gun locker	
Battle lantern	1 Each	On pilothouse support stanchion, facing forward	
Paper towel dispenser	1 Each	Port side above sink	



PASSENGER COMPARTMENT			
OUTFIT ITEM	QTY	LOCATION	
Hot cups	2 Each	Sink area in receptacles	
24-hour clock	1 Each	Port side above sink	
Mouth horn, reed	1 Each	Under sink	
Air horn, portable, w/propellant	1 Each	Under sink	
Ear protectors	2 Pair	Under sink	

PILOTHOUSE		
OUTFIT ITEM	QTY	LOCATION
Bell, 6"	1 Each	In mounting bracket, port side of the pilothouse door
Fire extinguisher, 10 lb. PKP	1 Each	In mounting bracket, starboard side of the pilothouse door
Battle lantern	1 Each	Starboard bulkhead
6 lb. pick axe	1 Each	Port bulkhead, under circuit breaker panels
Halon warning placard	1 Each	On steering console
Starting and securing placard	1 Each	On steering console
Fire pump RPM placard	1 Each	On steering console
Flashlight (heavy duty)	1 Each	On shelf, port side of steering console
Compass deviation table	1 Each	Mounted near chart table
RPM/speed/fuel curve	1 Each	Mounted near chart table
Binoculars (7 x 50)	1 Each	In holder inside electronics console
Penlight w/red lens	1 Each	Berth seat/storage area
NOS charts	For A.O.R.	Berth seat/storage area
Navigator's kit	1 Each	Berth seat/storage area
Stopwatch, w/sweep second hand	1 Each	Berth seat/storage area
Nautical slide rule	1 Each	Berth seat/storage area
Parallel ruler/Weems plotter	1 Each	Berth seat/storage area



PILOTHOUSE			
OUTFIT ITEM	QTY	LOCATION	
Dividers	2 Each	Berth seat/storage area	
Pencils #2	As Required	Berth seat/storage area	
NOS Chart No. 1	1 Each	Berth seat/storage area	
Navigation Rules (COMDTINST M16672.2)	1 Each	Berth seat/storage area	
CG Light List*	For A.O.R	Berth seat/storage area	
NOS Coast Pilot *	For A.O.R	Berth seat/storage area	
NOS Tide Tables *	For A.O.R	Berth seat/storage area	
NOS Tidal Current Tables *	For A.O.R	Berth seat/storage area	
CG Addendum to National SAR Manual (COMDTINST M16130.2)	1 Each	Berth seat/storage area	
Operating instructions for:			
Motorola MCX 1000	1 Each	Berth seat/storage area	
Raytheon AN/SPS-69 Radar	1 Each	Berth seat/storage area	
Leica MX-200 GPS	1 Each	Berth seat/storage area	
Leica MX-51R DGPS Upgrade	1 Each	Berth seat/storage area	
Raytheon Ray-430 Loudhailer	1 Each	Berth seat/storage area	
41' UTB Operator's Handbook	1 Each	Berth seat/storage area	
*Excerpts of the applicable government pu may be carried in a binder to fulfill this req		overing the unit area of responsibility	



## Appendix B 41' UTB Paint/Color Reference Guide

#### Introduction

This reference guide outlines information on protective coating for the 41' UTB. Listed in this guide are the topcoat colors, supply source, stock number, and reference for most painted items on the boat.

#### NOTE &

This guide is not the sole source of applicable information. The Coatings and Color Manual, COMDTINST M10360.3 (series) is the governing Coast Guard directive. If a conflict exists between this handbook and the Coatings and Color Manual, use that manual.

Commandant (G-SEN) requires prior approval before testing new coatings and preservation material. Copies of all correspondence must be provided to Commandant (G-SEN).

Only paint boat surfaces to prevent corrosion or deterioration. Clean soiled surface, do not repaint them.

### In this Appendix

Section	Title	See Page
Α	Interior and Exterior Surfaces	B-3
В	Safety Colors and Identification Colors	B-5
С	Unpainted Surfaces	B-7
D	Items Not Listed	B-9
Е	List of Items	B-11

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### Section A. Interior and Exterior Surfaces

### A.1. Interior surfaces

Do not paint interior surfaces more often than once every 3 years. Repainting too frequently results in paint film failure due to films which are too thick or films which are incompatible.

Apply the minimum number of coats required; usually one is sufficient.

### A.2. Exterior surfaces

Do not paint exterior surface more often than once a year.

Consider "touch-up" painting rather than complete repainting. Repair prior to paint film failure.

### Appendix B - Paint/Color Reference Guide





### Section B. Safety Colors and Identification Colors

### B.1. Safety colors

The Coast Guard safety color code complies with Occupational Safety and Health standards. These codes apply to the 41' UTB in conflict with other requirements. Safety colors warn of hazards and are not for decoration. They are discussed in the Coatings and Color Manual, COMDTINST M10360.3 (series).

# B.2. Identification colors

The colors for piping, valves, and operating levers are found in the Coatings and Color Manual, COMDTINST M10360.3 (series). These items are provided with a standardized color code.

### B.3. Repainting

New machinery, gear, and parts may have a factory painted finish. Do not repaint to the standard color until wear of the original paint requires refinishing.

### Appendix B - Paint/Color Reference Guide





### Section C. Unpainted Surfaces

### C.1. General

The following areas shall not be painted:

Surface	Items included but not limited to:
Stainless steel, chrome plated, and	rudder posts
decorative plastic surfaces	chart tables
	interior/exterior cabin handrails
	hot cup holders
	anchor brackets
	freshwater fill vent
	• cleats
Aluminum bilge surfaces	• plating
	• framing
Working surfaces of mooring and towing hardware	• none listed
Exterior wood is not painted because cracks and deterioration can not be detected	boat hooks

### Appendix B - Paint/Color Reference Guide





### Section D. Items Not Listed

#### D.1. General

Miscellaneous objects not listed in this guide or elsewhere shall be painted:

- White (17875), if attached or immediately adjacent to some part of the superstructure that is painted white or if the objects pose a stumbling hazard, particularly at night.
- Spar (10371), if the objects are attached or immediately adjacent to masts, spars, and other objects which are colored spar.

### Appendix B - Paint/Color Reference Guide





## Section E. List of Items

### **E.1.** General The following is a list of items and the correct color.

ITEM	COLOR/NUMBER	SOURCE/NSN	REFERENCE
Anchors	Galvanized		Coatings and Color Manual
Battle Lanterns	Factory/ Yellow/13538	8010-01-349-9005	Coatings and Color Manual
Boat Hooks	As per Appendix B, Section C		Coatings and Color Manual
Brightwork (wood)	Varnish		Coatings and Color Manual
Cabin Door			
Exterior	White/17875	8010-01-333-9449	Paint Sched. 41UT-1901-1
Interior	Brown/20117	8010-01-382-1896	Paint Sched. 41UT-1901-1
Cabin Exterior	White Gel Coat		Paint Sched. 41UT-1901-1
Cabin Top	Blue-Gray/16099	8010-01-360-9307	Paint Sched. 41UT-1901-1
Console Top	Dull Black/37038	8010-01-356-2938	Paint Sched. 41UT-1901-1
Console Sides	Brown/20117	8010-01-382-1892	Paint Sched. 41UT-1901-1
Deck Plates			
Тор	Aluminum Polish	8010-00-410-8452	Coatings and Color Manual
Bottom	Epoxy Primer/#FM156		Coatings and Color Manual
Decks (Exterior)	Blue-Gray/16099	8010-01-360-9307	Coatings and Color Manual
Defroster Vents	Dull Black/37038	8010-01-356-2938	Paint Schedule 41UT-1901-1



ITEM	COLOR/NUMBER	SOURCE/NSN	REFERENCE
Drop Pump Can	Intl. Orange/12197	8010-01-333-9811	Coating and Color Manual
Drop Pump Can Bracket	White/17875	8010-01-333-9449	Coating and Color Manual
Electrical Panels			
Outside	Blue/15123	8010-01-333-9821	Coatings and Color Manual
Inside	Intl. Orange/12197	8010-01-333-9449	Coatings and Color Manual
Emergency Steering Tiller	Galvanized (hot or cold)		Print 41UT-2202-2
Engines	Cummins Gray 3823304 B-Series	Seymour of Sycamore, Inc. (ph 1-800-435-4482)	Paint Schedule 41UT-1901-1
Ensign Mast (Flagstaff)	Spar/10371	8010-01-360-9307	Coating and Color Manual
Escape Hatch	Factory		BoatAlt 49
Exterior Bullnose/ Forward Chock	Spar/10371	8010-01-360-9307	Coatings and Color Manual
Fire Extinguishers	Factory Red/11105	8010-01-333-9813	Coatings and Color Manual
Fire Extinguisher Brackets	Factory Red/11105	8010-01-333-9813	Coatings and Color Manual
Fire System (General)	Red/11105	8010-01-333-9813	Coatings and Color Manual
First Aid Kit	Green/14260	8010-00-530-5563	Coatings and Color Manual
Freshwater Fill/Vent	No Coating		Coatings and Color Manual
Fuel Fill Caps	Yellow/13538	8010-01-333-9450	Coatings and Color Manual
Fuel Fill Pipes	White/17875	8010-01-333-9449	Coatings and Color Manual
Fuel Hoses (armored)	No Coating		
Goosenecks	Spar/10371	8010-01-360-9307	Coatings and Color



ITEM	COLOR/NUMBER	SOURCE/NSN	REFERENCE
			Manual
Gauges (danger zones)	Red/11105	8010-01-333-9813	Naval Eng. Manual
Halon Alarm	Red/11105	8010-01-333-9813	Coatings and Color Manual
Handrails/ Aluminum Exterior	Spar/10371	8010-01-360-9307	Coatings and Color Manual
Hull	White/17875	8010-01-333-9449	Coatings and Color Manual
Head Door	Factory or Yellow/23594	8010-01-333-7761	Coatings and Color Manual
Life Raft Shelf	White/17875	8010-01-333-9449	Coatings and Color Manual
Life Ring	Intl. Orange (Factory)		Rescue/Survival Sys. Manual
Life Ring Light	Intl. Orange(Factory)		Rescue/Survival Sys.  Manual
Mast	Spar/10371	8010-01-360-9307	Rescue/Survival Sys.  Manual
Mast Support Bracket	White/17875	8010-01-333-9449	Coatings and Color Manual
Name Plates	No Coating		Coatings and Color Manual
Nav. Light Screens (interior of)	Dull Black/37038	8010-01-356-2938	Coatings and Color Manual
Passenger Compt. Interior	Yellow/23594	8010-01-333-7761	Paint Schedule, 41UT-1901-1
Pilothouse Interior	Yellow/23594	8010-01-333-7761	Paint Schedule, 41UT-1901-1
Radar Tripod	Spar/10371	8010-01-360-9307	Coatings and Color Manual
Rudder Stops	White/17875	8010-01-333-9449	Coatings and Color Manual
Shore Tie Receptacle	Blue/15123	8010-01-333-9821	Coatings and Color Manual
	Factory/	8010-01-382-1896	Coatings and Color



ITEM	COLOR/NUMBER	SOURCE/NSN	REFERENCE
Benches	Brown/20117		Manual
Spotlights/Floodlight	Factory/ White/17875	8010-01-333-9449	Coatings and Color Manual
Stanchions	Spar/10371	8010-01-360-9307	Coatings and Color Manual
Steps (Mahogany)	Spar Varnish TT-V-119	8010-00-597-7856	Coatings and Color Manual
Deck Storage Box Lids	Blue-Gray/16099	8010-01-360-8068	Coatings and Color Manual
Steering Wheel	No Coating		Coatings and Color Manual
Stripe	Red/12199	8010-01-360-9305	Coatings and Color Manual
Stripe	Blue/15182	8010-01-360-9304	Coatings and Color Manual
Taff Rail	No Coating		Coatings and Color Manual
Tiller (Main Arms/Tie Bar)	No Coating		Coatings and Color Manual
Tow Bitt (Fwd & Aft)	No Coating		NAVSHIPS Tech. Manual
Tow Reel	White/17875	8010-01-333-9449	Coatings and Color Manual
Underwater Body	Black		Current Directives
Vents (Eng Rm exhaust)	White/17875	8010-01-333-9449	Coatings and Color Manual
Vents (Eng Rm intake)	Spar/10371	8010-01-360-9307	Coatings and Color Manual
Wiring (Electric Cables)	No Coating		NAVSHIPS Tech. Manual
Tri-gate	Red/11105	8010-01-333-9813	Coatings and Color Manual



## Appendix C 41' UTB Boat Alterations (BoatAlts)

#### **Overview**

Introduction

This appendix contains a list of authorized BoatAlts for the 41'UTB.

NOTE &

For a complete breakdown of the BoatAlt Number, see the Naval Engineering Manual, Chapter 041, COMDTINST M9000.6 (series).





BOATALT NUMBER	DESCRIPTION	DATE
(A)A-01	Miscellaneous Alterations and Improvements	16 Sep 74
(A)B-02	Relocation of M-60 Gun Mounts	16 Dec 74
(A)A-03	Performance Improvement of Engine Jacket Water Heaters	16 Dec 74
(A)C-04	Cummins V-903-N Conversion to Middle Sump Oil Pan	17 Dec 74
(A)B-05	Battery Charger Safety Precautions	10 Mar 75
(A)B-06	Standardization of Electronic Gear	04 Apr 75
	Amend 01 Removal of AN/SRC-42(V)	06 Oct 77
(A)B-07	Bow Chock Reinforcement, Engine Hatch Holding Cam Installation	15 Apr 75
(A)A-08	Standardization of Propeller Sizes and Alloys	10 Jun 75
	Amend 01 Standardization of Propeller Sizes and Alloys	25 Nov 75
(A)A-09	Steering Cable Maintenance and Inspection	30 Jun 75
	Amend 01 Steering Cable Maintenance Amendment	24 Apr 92
(A)A-10	Conversion to 2" Diameter Propeller Shafts	26 Aug 75
	Amend 01 Conversion to 2" Diameter Propeller Shafts	22 Oct 75
	Amend 02 Conversion to 2" Diameter Propeller Shafts	01 Dec 75
(A)A-11	Side Window Rain Guard and Coaming Installation	15 Aug 75
(A)A-12	Twin-Disc Lube Oil Suction Hose, Internal Support	Aug 75
(A)B-13	Main Engine Lube Oil Dipstick Marking	04 Nov 75
(A)B-14	Main Engine Lube Oil Pressure Switch Hose Installation	20 Jan 76
(A)B-15	Installation of Adjustable Alignment Assembly and Drive Belt Guard for Engine Driven Fire Pump	23 Jun 76
	Amend 01 Installation of Adjustable Alignment Assembly and Drive Belt Guard for Engine Driven Fire Pump	17 Feb 76
(A)X-16	Improved Propeller Struts	27 Jan 76
	Amend 01 Improved Propeller Struts	30 Dec 76
(A)B-17	Main Engine Salt Water Piping Modification	30 Jan 76



BOATALT NUMBER		DESCRIPTION	DATE
(A)A-18	Mast Modification an	d Towing Light Relocation	05 May 76
	Amend 01	Mast Modification and Towing Light Relocation	26 Aug 76
	Amend 02	Mast Modification and Towing Light Relocation	Undated
(A)B-19	Main Engine Salt Wat	ter Piping Modification	26 May 76
(A)X-20	Installation of Homer		08 Nov 76
(A)X-21	Searchlight Change Fi	rom 10" Incandescent to 7" Sealed Beam	Jun 77
(A)C-22	Installation of Trainab	ole Loudhailer Speaker Foundation	02 Aug 77
(A)X-23	Replacement of Vibra	tion Dampner Starboard Engine	06 Oct 77
(A)B-24	Removal Low Lube O	Dil Pressure Switch (Kim Hot Start)	20 Sep77
(A)X-25	Authorization for Rep	lacement of Console Engine Gauges	09 Sep77
		Authorization for Replacement of Console Engine Gauges	28 Mar 79
(A)A-26	Replacement of Engin	e Jacket Water Thermo Bulb Adapter	20 Sep77
		Replacement of Engine Jacket Water Thermo Bulb Adapter	25 Jan 78
(A)X-27	41' UTB Chart Table	and Light in Forward Cabin	14 Oct 77
(A)A-28	Installation of Stern T	ow Lights	16 Dec 77
(A)A-29	Installation of Updated	d VHF-FM Homer	10 Jan 78
(A)C-30	Standardization of Ele	ectrical Wiring	30 Jan 78
(A)B-31	AN/SQN-13/X Echo S	Sounding Set Replacement	07 Apr 78
(A)X-32	Single Leg Strut Asser	mbly	06 Nov 78
	Amend 01	Single Leg Strut Assembly	Undated
(A)A-33	Repair to Turnbull En	terprises Helmsman's Chair	28 Mar 79
(A)X-34	Optional Installation of	of Triton VHF-FM Transceiver	06 Jun 78
(A)B-35	Safety Hand Rails and	Grab Rails	28 Nov 79
(A)X-36	Replacement of Helms	sman Chair	30 Mar 79
(A)C-37	Replacement of AN/S	PS-57(X) Radar with AN/SPS-66 Radar	09 Mar 79
		AN/SPS-57(X) Radar Replacement Amendment	20 Aug 79



BOATALT NUMBER	DESCRIPTION	DATE
(A)C-38	Horn Relocation	22 Jan 79
	Amend 01 Horn Relocation	03 Feb 82
(A)C-39	Alignment Marks on PTO Drive Adapter	06 Jun 79
(A)B-40	Modification/Isolation Transformer Foundation	01 Nov 79
(A)B-41	Forward Engine Mounts, Cummins Engine V/VT-903M	29 Nov 79
(A)B-42	Emergency Lighting for Pilothouse and Cabin Area	10 Dec 79
	Amend 01 Emergency Lighting for Pilothouse and Cabin Area	12 Mar 80
(A)X-43	Installation of CEAN-GLH-100 Loudhailer	01 Apr 80
(A)X-44	Access Plate for Bilge Inspection in Cabin	01 Apr 80
(A)X-45	Structural Reinforcement	07 Jul 81
(A)B-46	Modification of Existing Mast	10 Sep 81
	Amend 01 Modification of Existing Mast	27 Aug 82
(A)B-47	Reduced Mast Height (New)	10 Sep81
	Amend 01 Reduced Mast Height (New)	27 Aug 82
(A)C-48	Loran-C Receiver/Remote Display Installation	29 Sep 81
	Amend 01 Loran-C Receiver/Remote Display Installation	22 Dec 81
(A)B-49	Incorporation of Additional Safety Features	25 Mar 82
(A)C-50	Installation of Mast Support Rails and Engine Room Vents	16 Jun 82
	Amend 01 Installation of Mast Support Rails and Engine Room Vents	04 Feb 83
(A)B-51	Installation of Rotary Switch for Navigational Lights	27 Aug 82
(A)B-52	Rewiring of Rotary Switch for Navigational Lights	27 Aug 82
(A)C-53	Stowage of Anchor, Fire Monitor and Monitor Stanchion in Forepeak	10 Feb 83
(A)B-54	Move Fire Pump Gauge	24 Mar 83
(A)C-55	Replacement of Bilge Alarm Float Switches	17 Mar 83
(A)C-56	Installation of Halon 1301 Fire Extinguishing System	28 Mar 83
	Amend 01 Installation of Halon 1301 Fire Extinguishing System	08 May 85



BOATALT NUMBER	DESCRIPTION	DATE
(A)B-57	Conversion to VT-903M Engines	03 Jan 84
	Amend 01 Conversion to VT-903M Engines	11 Jun 84
	Amend 02 Conversion to VT-903M Engines	28 Mar 85
(A)B-58	Inline Fuel Sight Glass	31 Jan 84
	Amend 01 Inline Fuel Sight Glass	30 Apr 84
(A)B-59	Removal of 12V DC Power Panel	15 Feb 84
(A)B-60	Windshield Wiper Switch Relocation	15 Feb 84
(A)B-61	Installation of 24V Docking Lights	17 Feb 84
(A)B-62	Engine Alarm Modification	23 Feb 84
(A)B-63	Lighting Modification	01 Mar 84
	Amend 01 Lighting Modification	16 May 84
	Amend 02 Lighting Modification	11 Jun 84
(A)X-64	Secure Gun Rack	28 Mar 84
	Amend 01 Secure Gun Rack	09 Jan 85
(A)B-65	Jacket Water Pump Bolt Replacement	21 May 84
(A)B-66	Voltage Regulator Replacement	11 Jun 84
(A)B-67	Navigator's Seat Hole Cover	20 Jun 84
(A)A-68	Life Raft Stowage Shelf Spacer Shims	20 Aug 84
(A)A-69	CRP-750 Loran-C Receiver Installation	30 Aug 84
(A)X-70	Heating System Booster Pumps	14 Dec 84
(A)X-71	24 V DC Windshield Washer Pump Installation	29 Apr 85
	Amend 01 24 V DC Windshield Washer Pump Installation	19 Sep 86
(A)A-72	Life Raft Inflation Cylinder Replacement	07 May 85
(A)B-73	Rubber Rubrail Installation	30 Sep 86
	Amend 01 Rubber Rubrail Installation	29 Nov 91
(A)A-74	Cabin Aft Window Replacement	29 Dec 86
(A)B-75	Defroster Booster Blower	03 Feb 87
(A)A-76	Shore Tie Connector Replacement	10 Mar 87
	Amend 1 Shore Tie Connector Replacement	16 Feb 94
	Amend 2 Shore Tie Connector Replacement	29 Aug 94



BOATALT NUMBER	DESCRIPTION	DATE
(A)A-77	MCX-1000 DES Radio Installation	10 Apr 89
	Amend 01 MCX-1000 DES Radio Installation Amendment	10 Sep 91
(A)A-78	Navigation Light Standardization. Addition of Second Towing Light.	27 Feb 90
(A)A-79	Depth Sounder Replacement	15 Jun 90
(A)A-80	Visual Identification Modification	02 May 91
(A)B-81	Engine Mount Modification	10 Sep 91
(A)B-82	Cabin Air Vent Removal	04 Oct 91
(A)A-83	Forward Cabin Deck Hatch Modification	07 Oct 91
(A)C-84	Engine Chock Replacement	09 Mar 92
(A)A-85	Surface Search Radar Replacement	09 Mar 92
(A)C-86	AC Power Distribution Panels	23 Mar 92
(A)B-87	Fuel Oil System Replacement	03 Feb 93
(A)B-88	Navigation Lights And Mast Standardization	09 Jun 93
	Amend 1 Navigation Lights And Mast Standardization	29 Jul 93
(A)B-89	Depth Sounder Replacement	27 Jan 94
(A)A-90	VHF-FM Direction Finder Replacement	20 Mar 95
(A)C-91	41' UTB Well Deck Standardization	21 Mar 95
(A)C-92	Removable Battery Trays	19 Oct 95
(A)A-93	Spin-On Lube Oil Filter	21 Mar 95
(A)A-94	MX-200 GPS Receiver Installation	22 Sep 95
	Amend 01 41'DGPS Installation	16 Apr 98
(A)A-95	Electronic Suite Upgrade, All 41' UTB's	28 Dec 95
(A)A-96	Coxswain Chair Gussets	01 Apr 96
(A)B-97	41' UTB Electronic Tachometers	16 May 96
	Amend 01 41' UTB Electronic Tachometers	Undated
(A)B-98	Trim Tab Standardization	05 Jun 96
	Amend 01 Trim Tab Standardization	Undated
B-99	Engine Air Separator Installation	01 Jul 97
B-100	Bilge Alarm Upgrade	19 Aug 98

#### Appendix C - Boat Alterations





# Appendix D 41' UTB Material Inspection Checklist

#### Overview

#### Introduction

- 1. This appendix is meant to be a systematic means to inspect any 41' UTB and ensure the entire boat is prepared to meet mission demands. This enclosure should be used in conjunction with Appendix A and B.
- 2. This checklist may be locally reproduced.

#### In this appendix

No.	Area	See Page
Ī	Hull	D-4
II	Foredeck	D-4
III	Forepeak Compartment	D-5
IV	Pilothouse Top	D-6
V	Passenger Compartment	D-6
VI	Bench Seats and Compartments	D-8
VII	Head	D-8
VIII	Passenger Compartment Storage Area	D-9
IX	Pilothouse	D-11
X	Main Deck	D-13
XI	Port Main Engine	D-15
XII	Starboard Main Engine	D-16
XIII	Main Engine Accessories	D-17
XIV	Well Deck	D-18
XV	Deck Storage Boxes	D-19
XVI	Lazarette	D-20





# 41' UTB MATERIAL INSPECTION CHECKLIST

BOAT #	UNIT	Date
References	<ul> <li>Naval Engineering M</li> <li>Color and Coatings N</li> <li>Rescue and Survival</li> </ul>	Handbook, COMDTINST M16114.2 (series)  Manual, COMDTINST M9000.6 (series)  Manual, COMDTINST M10360.3 (series)  Manual, COMDTINST M10470.10 (series)  and System Support Book, SICPINST M4441.84
Standards	•	ds apply to the boat's hull, superstructure, utfit, and all installed systems and accessories:
	<ul> <li>Protective coatings ap</li> <li>Free of rips, tears, about the Labels, test dates, and</li> <li>Outfit and equipment</li> <li>Outfit and equipment plan.</li> </ul>	st, and corrosion. ressure readings are within tolerance. oplied correctly and neatly.
Guidelines	Boatswains Mate and experience with the 41' I references. Each item of applicable Inspection States	equires a minimum of two personnel, preferably a a Machinery Technician, each with extensive UTB and a strong working knowledge of all listed on the checklist should be measured against the andards and the governing references. Items or should be added to the appropriate section.
Inspected By:		



# I. Hull

	Sat.	Unsat.	Remarks
Hull			
Waterline			
Lettering, numbering, decals			
Docking lights			
Rubrails			
II. Foredeck			
II. Foredeck	Sat.	Unsat.	Remarks
II. Foredeck Bullnose	Sat.	Unsat.	Remarks
	Sat.	Unsat.	Remarks
Bullnose	Sat.	Unsat.	Remarks
Bullnose Forward bitt	Sat.	Unsat.	Remarks
Bullnose Forward bitt Escape hatch	Sat.	Unsat.	Remarks
Bullnose Forward bitt Escape hatch Anchor line plug	Sat.	Unsat.	Remarks
Bullnose Forward bitt Escape hatch Anchor line plug Cabin fore deck	Sat.	Unsat.	Remarks



# **III. Forepeak Compartment**

	Sat.	Unsat.	Remarks
Deck hatch			
Bulkhead			
Overhead			
Deck plates			
Bilge			
Wiring			
Docking lights			
Light			
Electrical junction boxes			
Stand-off wire clamps			
Anchor (22 lb./25 lb.), galvanized			
Anchor line securing staple			
D-ring shackle, <sup>7</sup> /8" galvanized			
Shackle, screw pin, ½" galvanized			
Anchor leader chain, galvanized			
Swivel, ½" galvanized			
Anchor line, 2 ¾" DBN, 300 feet			
Wire rope thimble, 5/8" galvanized			
Portable fire monitor			
Monitor mounting stanchion			

REMARKS:			 



# IV. Pilothouse Top

	Sat.	Unsat.	Remarks
Safety handrails			
Radar antenna			
Radar pedestal			
Horn			
Loudhailer speaker			
Searchlight aft			
Stuffing tubes			

REMARKS:	

## V. Passenger Compartment

	Sat.	Unsat.	Remarks
Deck covering			
Lower cabin bilge hatch			
Bilge/ensolite			
Frames/longitudinals			
Cabin overhead			
Cabin bulkheads			
Lighting			
Wiring			
Standoff wire clamps			
Stokes litter (tending lines)			



# V. Passenger Compartment (continued)

	Sat.	Unsat.	Remarks
Gun locker			
MK13 (12 each)			
MK79 (02 each)			
Personal signal kits (05 each)			
First aid kit, 10 man			
5 lb. CO <sub>2</sub> Fire extinguisher			
Hand-held searchlight/bracket			
Ladder			
Forward compartment handrails			
Defroster booster blower			
Under sink stowage			
Reed mouth horn			
Portable air horn			
Ear protection (02 each)			
Sink O/B discharge valve			
Sink and faucet			
Hot cups			·
Paper towel dispenser			
24-Hour Clock			

REMARKS:	 	



# **VI. Bench Seats and Compartments**

		T	
	Sat.	Unsat.	Remarks
Port cushion/storage			
Grapnel hook, 4 lb. w/100'2" DBN			
Wool blankets (04) covered			
Pillows (02) covered			
Swim fins (01 pair)			
Swim mask (01 each)			
Swimmer's harness w/70' line			
Helmets, goggles & gloves (03 sets)			
Heater, hoses, & fittings			
Misc. engineering spare parts			
Starboard cushion/storage			
CG Type I PFD			
Adult (04 each)			
Child (02 each)			

REMARKS:	 ·		 
	 <del></del>	<del></del>	

## VII. Head

	Sat.	Unsat.	Remarks
Head door w/kick panel			
Head deck/covering			
Head bulkhead			



## VII. Head (continued)

	Sat.	Unsat.	Remarks
Chemical toilet			
Escape hatch			
Handrail			
Head light			

REMARKS:	 		<u></u>	 
	 	<del></del>		 

# VIII. Passenger Compartment Storage Area

	Sat.	Unsat.	Remarks
Deck matting			
Bilge pump/valve/check valve			
Fenders, 8" x 30" (04 each) (white)			
Tool box			
Alongside lines			
2 3/4" x 30', DBN (02 each)			
2 3/4" x 60', DBN (02 each)			
Oil can			
Damage control kit			
Vari-nozzle, 95 GPM			
Eductor			
Fire hoses			
2 ½" x 12' w/ends			



## VIII. Passenger Compartment Storage Area (continued)

	Sat.	Unsat.	Remarks
2 ½" x 30'			
1 ½" x 50'			
1 ½" x 25'			
Safety ground wand			
Inport heater, 110 VAC			
Electronic power supplies			
Garbage receptacle			
10 lb. PKP fire extinguisher			
Battle lantern			
Steering cable			
Engine room viewing window			
Stuffing tubes			
Wiring and cables			
Halon bottle/hose/bracket			
Halon instruction placard			
Water tank/mount/fittings			

REMARKS:	 	



## IX. Pilothouse

	Sat.	Unsat.	Remarks
Deck and covering			
Side windows and frames			
Rear window and frame			
Forward windows and frames			
Weather-tight door			
Grounding straps			
Port bulkhead			
Port handrail			
Bell and mount			_
120V AC power panels			
24V DC power panel			
12V DC power panel			
Bilge/fire alarm panel			
Amp and volt meters			
Starboard bulkhead			
Starboard handrail			
Battle lantern			
Aft Bulkhead			
Firemain gauge and tubing			
Coxswain's console			
Defroster ducts/hoses/fitting			
Magnetic compass and red light			
Deviation table (posted)			



# IX. Pilothouse (continued)

	Sat.	Unsat.	Remarks
Electronics console			
Raytheon AN/SPS-69 radar			
MX-200 GPS/DGPS			
KDF-538 ADF			
Raytheon RAY-430 loudhailer			
Motorola DES radio			
Binocular storage			
Chart light w/red bulb			
ST-50 fathometer			
Windshield wipers			
Navigator's chair			
Coxswain's chair			
Speakers			
VHF-FM working			
VHF-FM guard			
ADF			
Engine gauge panel			
Alarm cutout switches			
Booster blower switch			
Halon test button			
Light switches			
Dimmer switches			
Windshield wiper switches			
Steering wheel			
Engine throttles			



## IX. Pilothouse (continued)

	Sat.	Unsat.	Remarks
Engine stops			
Fuel stop placard			
Electric horn			
Starter buttons and shield			
Starting and securing placard			
Halon warning placard			
Fire pump warning placard			
Boat plate			
Overhead			
Trainable loudhailer			
Trainable searchlight			
Wiring			
Stuffing tubes			
RPM/speed/fuel curves (posted)			
10 lb. fire extinguisher			

REMARKS:	 		· · · · · · · · · · · · · · · · · · ·	

## X. Main Deck

	Sat.	Unsat.	Remarks
Deck/covering			
Gunwales	-		
Handrails/stanchions			



# X. Main Deck (continued)

	Sat.	Unsat.	Remarks
Aluminum safety chains			
M-60 gun mounts			
Cleats			
Boat hooks (02) with markings			
Engine room vents			
Fresh water tank fill/vent			
Shore tie receptacle			
24" Ring buoy			
Polypropylene line, ½" 75 feet			
Float light w/battery date			
Life raft in canister			
Fire main station			
Mast			
Mast hardware			
ADF antenna			
MCX-1000 antenna			
GPS antenna			!
DGPS antenna			
#5 Coast Guard Ensign			
Junction box/stuffing tubes			
After tow bitt			

REMARKS:	



# XI. Port Main Engine

	Sat.	Unsat.	Remarks
Engine block			
Cylinder heads			
Fuel pump/governor			
Turbocharger			
Marine gear			
Jacket water cooling system			
Marine gear cooler			
Exhaust system/lagging			
Shaft and packing			
Starter			
Alternator			
Hot starts and wiring			
Throttle/shift/stop cables			
Wiring			
Engine mounts			
Lube oil system			

REMARKS:	 	 	 



# XII. Starboard Main Engine

	Sat.	Unsat.	Remarks
Engine block			
Cylinder heads			
Fuel pump/governor			
Turbocharger			
Marine gear			
Jacket water cooling system			
Raw water system			
Marine gear cooler			
Exhaust system/lagging			
Shaft and packing			
Starter			
Alternator			
Hot starts and wiring			
Throttle/shift/stop cables			
Wiring			
Engine mounts			
Lube oil system			

REMARKS:	 	



# XIII. Main Engine Accessories

	Sat.	Unsat.	Remarks
Hatches/scuttle			
Ladder			
Bulkheads			
Insulation			
Lighting			
Overhead			
Deck plating			
Bilges			
12V batteries w/terminal cover			
Ventilation ducts			
Sea chest and valves		·	
Sea strainers and piping			
Fire pump strainer			
Fire pump			
PTO angle bracket (starboard only)	<u> </u>		
Fuel oil strainer / valves / hoses			
Bilge pump / hose / check valve			
Electrical system			
Bilge alarm			
Transducer			
120V AC isolation transformer			
Oil pollution placard			
Halon warning placard			

REMARKS:		



## XIV. Well Deck

	Sat.	Unsat.	Remarks
Deck/covering			
Gunwales			
Scuppers			
Taff rail			
Flag post & securing pin			
#11 National ensign			
Fuel fills			
Fuel vents			
Tow reel and cover			
Towline, 2 ¾" DBN, 600 feet			
Portable pump w/seal & retro.			
Pump bracket			
Gas can, 5 gallon red			
Gas label "GASOLINE- FLAMMABLE"			
Gas can bracket			
Fuel sounding rods			
Steering cable & hardware			
Rudder posts and stops			

REMARKS:	 	 



# XV. Deck Storage Boxes

	Sat.	Unsat.	Remarks
Port step box			
Heaving lines (02)			
Rescue heaving line			
Skiff hook			
Shackles (04 assorted sizes)			
Starboard step box			
Chafing gear			
Lead line			
Shackle, 34" galvanized			
T-handles (02 different sizes)			

REMARKS:	 	 	 

## XVI. Lazarette

	Sat.	Unsat.	Remarks
Well deck scuttle			
Bilge			
Bulkheads			
Overhead			
Exhaust pipes			
Mufflers/clamps			
Fuel tank access covers/gasket			



# XVI. Lazarette (continued)

	Sat.	Unsat.	Remarks
Emergency tiller			

REMARKS:		 	



# Appendix E 41' UTB Disabling Casualties

#### **Overview**

#### Introduction

This appendix contains disabling casualties for the 41' UTB. Refer to Section 5.A. for steps to follow if any of these casualties occur.

#### In this appendix

Title	See Page
Engine parameters	E-3
Engineering system components	E-3
Electronic/ navigation	E-3
Safety	E-4
General material	E-4





### **Disabling Casualty List**

# Engine parameters

- Reduction gear pressure below 190 psi.
- Engine lube oil pressure below 30 psi.
- Engine jacket water temperature below 140 degrees or above 212 degrees.
- Engine speed less than 2400 RPM or greater than 2900 rpm.

# Engineering system components

- Engine fails to start.
- Uncontrollable overheats.
- Metallic/non-metallic noise: metal on metal/fuel-knock/bearing/clicking.
- Excessive shaft or engine vibration.
- Engine surging/over speed (over 50 RPM).
- Loss of engine governor control.
- Reduction gear fails to engage (forward or reverse).
- Fuel oil dilution 5% or above.
- Water in engine lube oil (emulsified white milky oil).
- Lube oil in engine jacket water.
  - More then a light sheen.
  - Floating unmixed lube oil separated from the water.
- Alternator failure.
- Continuous electrical breaker trip.
- Starting batteries won't charge.
- Steering system inoperative.
- Engine motor mount hardware loose or missing.
- Excessive shaft packing leak:
  - Packing while rotating trickle or steady stream.
  - Packing while not rotating more than 15 drops per minute.

#### Electronic/ navigation

- No electronic means of signaling distress (i.e. no radio, EPIRB, etc.).
- Electronics won't energize.



#### Safety

- Any fuel or lube oil drop\* falling on a hot surface (hot surface is defined as a surface greater than 400 degrees, even if covered by insulation).
- Electrical arching and sparking.
- Turbocharger lube oil supply line leaking on to hot surface or not fire rated/fire sleeved.
- Return fuel oil line leaking in the vicinity of the turbocharger where the turbo attaches to the saddle.
- Fixed (Halon) fire extinguishing system inoperative (pressure below 425 psi, disconnected, etc.), PLUS no portable fire extinguishers (unserviceable).
- Emergency alarms inoperative (fire, bilge, lube oil pressure, high water temp).
- \* To determine if fuel oil or lube oil dripping is occurring, a clean sheet of paper may be placed under a suspected leak to collect and detect any drops that fall.

#### General material

- Hull breach below the waterline (except on the skeg = restrictive).
- Inoperative (closed) sea-chest valve.



## Appendix F 41' UTB Restrictive and Major Discrepancies

### Overview

#### Introduction

This appendix contains restrictive and major discrepancies for the 41' UTB. Refer to Chapter 5, Section A for steps to follow if any of these casualties occur.

### In this appendix

Title	See Page
Restrictive Discrepancies	F-3
Major Discrepancies	F-5





## **Restrictive Discrepancies**

# Engine parameters

- Engine speed less than 2575 RPM.
- Reduction gear pressure greater than 220 psi
- Water temp greater than 205 degrees.

# Engineering system components

- Leaks greater than 15 drops a minute.
  - Antifreeze/ Jacket water
  - Raw water
  - Lube oil
  - Hydraulic oil
  - Reduction gear oil
  - Fuel tank access cover
- Fuel oil dripping\* (falling onto a surface which is not hot) within ten (10) minutes.
- Bilge system valves/check valve installed incorrectly or missing.
- Bilge pump inoperative.
- Inoperative/inaccurate gauges
  - Engine pressure/temperature gauges.
- Any detectable exhaust leaks.
- Fuel shut off valves do not fully close.
- PTO locking device missing or allows engagement.
- Missing or loose shafting bolts.
- Fire pump fails to engage.
- \* To determine if fuel oil dripping is occurring, a clean sheet of paper may be placed under a suspected leak to collect and detect any drops that fall.

#### **Boat outfit**

- Missing boat pyrotechnics.
- Missing personal pyrotechnics vest and or strobe light.
- Portable drop pump inoperative or missing.
- Tow line less than 100 feet of required length.
- Missing emergency tiller.
- Missing life raft.



### Electronics/ navigation

- Compass deviation table missing/compass deviation greater than 5 degrees.
- VHF-FM radio inoperative.
- Depth finder inoperative.
- GPS inoperative.
- Radar inoperative.
- Navigation lights inoperative/incorrect configuration.

### Safety

- Missile hazard/obstruction of egress route.
- Fire extinguisher not secured in bracket.
- Underweight Halon (with less then 425 psi or 42 lbs.)
- Any (2) portable fire extinguishers missing/unserviceable
- Boat Alt #68 Life raft spacer shims missing/incorrect.
- Improperly secured batteries.
- Head door has locking capabilities.
- Missing exhaust lagging or system blankets.
- Applied non-skid on main decks ineffective/missing. Any traffic/working area without non-skid for an 8.5" x 11" area (including area forward and aft of Cleat 4).
- Deck covering (carpet/matting) not properly attached to the deck.

### General material

- Breach of watertight integrity.
- Failure of a watertight closure to seal. Any unrestricted access which would allow water intrusion into the boat.
- Cracks through a watertight scuttle/hatch.



### **Major Discrepancies**

# Engine parameters

- Jacket water temperature less than 165 degrees or greater than 195 degrees.
- Engine speed greater than 2700 RPM.

# Engineering system components

- Loose/missing fittings, nuts, bolts, brackets, etc.
  - Raw water discharge bracket over exhaust flange.
  - Raw water support brackets forward of both engines missing.
  - Hardware on engines used for attaching equipment.
- Fire pump fails to operate at a minimum pressure of 80 psi.
- Fire main pressure gauge inoperative.
- Leaks less than 15 drops a minute.
  - Antifreeze/ jacket water
  - Raw water
  - Lube oil
  - Hydraulic oil
  - Reduction gear oil
- Fuel oil return hose routed over exhaust system.
- Fuel oil return check valve bracket missing.
- Engine fluid levels below minimum required.
- Boat Alt #1 Port engine lube oil filter location.
- Undersized engine mounting bolts and/or bolts constructed of inferior grade.

#### Boat outfit

- Type I PFDs (missing/unserviceable).
- Life ring and/or distress light (missing/unserviceable).

### Electronics/ navigation

- Compass light inoperative.
- Expired deviation table.
- Searchlight inoperative.



### Safety

- Sharp, jagged, or protruding edges of engine room bulkhead sheathing.
- Protruding exhaust lagging securing wire.
- Scuttle not flush with the deck causing a tripping hazard.
- DC kit saw missing sheath.
- Hatch and scuttle safety locks do not engage when item is in open position.
- Pilot house folding step worn, bent, or cracked.
- A power distribution panel missing breakers or blank covers.
- Engine guards inadequate or missing around moving machinery.
- Battery box covered or securing bracket loose.
- Mounting hardware too long.
- Boat Alt #56 Amend 1 Halon discharge pipe location.
- Boat Alt #35 Safety egress handrail missing.
- Boat Alt #42 Emergency lighting location or missing.
- Life raft overdue on 1 or 5 year inspection.
- Any (1) portable fire extinguisher missing/unserviceable
- Fire extinguisher unrecorded or improper PMS completion.
- Hydrostatic testing of fixed or portable cylinders not completed or recorded on equipment tag.
- Fire hoses past due for hydrostatic testing.
- Missing or loose coxswain chair mounting hardware.
- Mast support bracket missing or loose.
- Port-A-Potty not secured to the deck.
- Coxswain chair seat belt missing.

### General material

- Holes in watertight structure.
  - Improperly filled holes.
  - Hardware bolted through a watertight hatch or scuttle.
- Boat Alt #40 Isolation transformer foundation not completed.
- Holes in structure, equipment, mounts causing weakening of item.
- Wire run between engine room and pilothouse not sealed.
- Bilge pump hoses missing hose clamps.



## Appendix G 41' UTB Full Power Trial

# Overview

### Introduction

This appendix contains the full power trial requirements for the 41' UTB to ensure that the boat operates to prescribed standards.





## 41' UTB Full Power Trial Procedure

# Conducting a full power trial

Step	Procedure					
1	Prior to starting the engines, attach a reflective strip to the accessory drive pulley or vibration damper for use with a handheld strobe tachometer.					
2	After the engines are started, check the idle speed with the hand- held tachometer. Test all engine alarms from the engine room test panel (inoperative alarms are a disabling casualty).					
3	Get the boat underway for a ten (10) minute transit on a relatively straight course. Bring the engine up to full speed.					
4	After approximately eight (08) minutes, check engine speed in the engine room with the hand-held strobe tachometer. Normal engine speed range is 2575-2700 RPM.					
5	<ul> <li>Check for the following abnormalities, which occasionally occur during the full power trial:</li> <li>Any fuel oil or lube oil dripping* on a hot surface is a disabling casualty (hot surface is defined as a surface greater than 400 degrees, even if covered by insulation).</li> </ul>					
	<ul> <li>The turbocharger lube oil supply hose leaking on to a hot surface or not fire rated or fire sleeved is a disabling casualty.</li> <li>A leak from the shaft packing, equivalent to a trickle or steady stream, while rotating is a disabling casualty.</li> </ul>					
	<ul> <li>Any leak from the shaft packing, in excess of 15 dpm, while not turning is a disabling casualty.</li> </ul>					
	• Any fuel oil drop* falling within 10 minutes, not on a hot surface, restrictive discrepancy.					
	Any anti-freeze, raw water, lube oil, or hydraulic oil leaks greater than 15 dpm are a restrictive discrepancy.					
	• Any anti-freeze, raw water, lube oil, or hydraulic oil leaks less than 15 dpm is a major discrepancy.					



Step	Procedure				
5 (cont.)	• Any fuel oil leak on the fuel tank access covers greater than 15 dpm is a restrictive discrepancy.				
(cont.)	Any fuel oil leak on the fuel tank access covers less than 15 dpm is a major discrepancy.				
	* To determine if dripping is occurring, a clean sheet of paper may be placed under a suspected leak for up to ten minutes to collect and detect any drops that fall.				
6	Check all gauges on the console and record the readings. Refer to the following chart for allowable ranges and results:				

Categories	Disabling	Restrictive	Major	Normal	Major	Restrictive	Disabling
Oil Pressure	<30	<u> </u>		30-65			
Water Temp.	<140		<165	165-195	>195	>205	>212
Red. Gear Pressure	<190			190-220		>220	
Engine RPM	<2400	<2575		2575-2700	>2700		>2900

Figure G-1 Allowable Ranges and Results

7	Return to the mooring. Secure both engines and check all fuel
	fittings, including under the fuel pump in the engine vee, for leaks.


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